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Industrial Medicine

for

Physicians and Surgeons in Industry

Volume 3 JANUARY, 1934 Number 1

THIS ISSUE

The Industrial Physician

—What He Is Thought to Be—What He Is and Should Be—and What He Can Be—

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Such grace shall one just man find in his sight
That he relents, not to blot out mankind,
And makes a covenant never to destroy

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The Earth again by flood, nor let the sea
Surpass his bounds, nor rain to drown the world
With man therein or beast; but, when he brings
Over the Earth a cloud, will therein set
His triple-coloured bow, whereon to look
And call to mind his covenant. Day and night,
Seed-time and harvest, heat and hoary frost,
Shall hold their course, till fire purge all things new,
Both Heaven and Earth, wherein the just shall dwell."

—JOHN MILTON.

The Law, the Science and the Economics of Industrial Health

Volume 3 **JANUARY, 1934** **Number 1**

The Industrial Physician

—What He Is Thought to Be—What He Is and Should Be—and What He Can Be—

by

C. O. SAPPINGTON, M.D., Dr.P.H.,
Consulting Industrial Hygienist

PERHAPS there is no more misconception about any of the various phases or specialties of medicine and public health work than there is about the duties or the program of the industrial physician. This is but a natural result of the loose thinking that has been applied in general to the different specialties of medicine over a period of considerable time and also the fact that industrial medicine as such is relatively new, having started in an organized fashion only about 20 years ago.

It is obvious to most people what the field of the eye, ear, nose and throat specialist is—the child specialist—the orthopedist—the radiologist—and others which are well known. Regarding the industrial physician, however, for the most part at least, it has been a guess as to what his regular functions are.

Briefly stated the usual conception of the industrial physician is that he takes care of the emergency and minor surgical cases in any given industry; in addition to this, it is usually thought that he makes certain outside calls on those who are seriously or acutely ill.

What He Is and Should Be

A GOOD idea of what an industrial physician is and should be may first be gained by knowing what industrial health work is. Various definitions have been given for this expression; among them is the following:[1] "Industrial health work includes provisions for the protection, conservation and maintenance of mental and physical health for the industrially employed. This includes also the effect of his industrially employed. This includes also the effect of his industrial environment upon the employee and his reaction to it."

In a more specific way, Britton[2] has simply defined the industrial health program in the following terms:

The organization of the medical staff and the program of its work includes: (1) examination of all new employees; (2) periodic re-examination of all employees; (3) regular inspection of all working conditions; ventilation, lighting, temperature variation, general sanitary conditions and cleanliness—and special supervision of all known conditions where there is a health hazard; (4) consultation and advice for any employee on personal health problems; and (5) active cooperation in community health activities. The cost of a well organized, competent medical department which can regularly and satisfactorily carry on all the functions will not be an impossible burden on industry. If industry does less, it is not carrying its full share.

The qualifications of the industrial physician have been stated by various persons and authorities. McCord[3] has believed that the following

1. Sappington, C. O., M.D.: "Industrial Health and Its Relation to Industrial Safety." *Transactions of the National Safety Council,* 1932, p. 155.

2. Britton, James A., M.D.: "Health Services in Industry: Equipment, Personnel and Cost." *Transactions of the National Safety Council,* 1931, p. 160.

3. McCord, C. P., M.D.: *National Safety News,* May, 1930, p. 38.

are the essentials:

1. The industrial physician should have some experience in general practice in order that he may know man and his foibles.

2. He should have a knowledge of medical practice, not necessarily profound; of the fundamentals of industrial relations; of applied preventive medicine; occupational diseases, psychopathic medical investigation; recreation and accident prevention methods.

3. He should have knowledge of the special problems relating to employment of women and children; some knowledge of pensions and insurance, including liability and group; some knowledge of plant organization, which is likely to prove effective in dealing with the problems of labor.

4. He should have knowledge of employment methods; some notion of job analysis, physical and mental tests, to determine the fitness of applicants; knowledge of race problems, industrial training, apprenticeship, continuation schools for training in particular jobs, and at least some knowledge in relation to the cost of living according to local standards.

5. He should have knowledge of the hours of work in relation to fatigue and output; knowledge of shift systems, rest periods, regularity, absenteeism, labor turnover and its cost.

6. He should have at least a superficial knowledge of the security and continuity of employment in slack seasons, while convalescing from accident or disease, in case of labor-saving improvements, as well as with the advent of old age.

7. He should have a general knowledge of physical working conditions, safeguards, disagreeable gases and dusts, heating, lighting, ventilation, locker rooms, wash rooms, rest rooms, restaurants, hospitals, laundries, toilets, showers, plant beautification, drinking water, etc.

8. He should be qualified to carry out physical examinations of applicants and periodic reexaminations of employees.

9. He should have very definite knowledge of housing, transportation, recreational and educational facilities; the transfer and replacement of misfits, or, as has been said "fitting the square peg into the round hole."

10. He should be familiar with the follow-up work, especially among new employees, and with the injured; and familiar with the replacement of injured and crippled employees.

What the industrial physician should know has also been given a great deal of consideration. Gray[4] for instance, has said that an industrial physician should be familiar with the classifications, causes, treatment, and methods for prevention of occupational diseases, and advises that the general classification of Hayhurst, printed in the *Monthly Labor Review* of the Bureau of Labor Statistics, U. S. Department of Labor, July, 1929, be used as a guide. This classification includes: (1) specific occupational diseases; (2) diseases partly occupational, namely, hazards elsewhere; (3) occupational health complaints; and (4) nonconformities advanced by occupation. Gray further states that it is wise to have in mind the principal factors involved in industrial environment which may be named as follows: (1) those conditions in industry where poisonous materials and hazardous processes are utilized; (2) general ventilation; (3) illumination; (4) sanitary facilities; and (5) conditions conducive to industrial fatigue.

Especially interesting is the relationship of the physician to other officers of an industrial organization. Dr. T. Lyle Hazlett[5] has described what he believes to be the qualifications of what he calls the physician-administrator:

First among these, there must be a sound medical foundation. This not only includes graduation from an A-1 medical college, followed by at least one year's internship in a good general hospital, and if possible some further post-graduate work, but a full collegiate course is also desirable. In a large medical organization it is very desirable to have men who, in addition to the foregoing, have had special training in eye work, orthopedic surgery, nose and throat, x-ray, and physiotherapy. Further, there must be shown an interest in industrial health hazards, such as irritation of lungs by various dusts, in sanitation, fatigue, thermal conditions, and, in manufacturing, the effect of electric current on the human body. If this interest is not evident at first, it must be created through changing the routine of the medical staff by occasional post-graduate courses, special medical meetings, etc. This will not only broaden the mind of a man doing industrial work but also will have a marked tendency in keeping him from becoming mechanical in the treatment of routine cases. And it has been thought desirable for all men to maintain a private office if only for one hour a day,

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4. Gray, A. S., M.D.: "Qualifications for the Industrial Physician from the Viewpoint of the State Health Department." Quoted from Industrial Health Page of *National Safety News*, November, 1930, p. 50.

5. Hazlett, T. Lyle, M.D.: "The Physician-Administrator." *Transactions of the National Safety Council*, 1930, p. 160-161.

thus keeping an additional contact with the public, aside from increasing income.

The second requirement would be a pleasing personality. Confidence of employees is perhaps more dependent upon this than any other qualification. First impressions are the most vital. In the examining room for new employees will be painted a picture which may have a great bearing on the employees' attitude toward the company, and it may be beneficial or harmful depending largely on the examining physician. In the present rate of production there must be a sympathetic attitude somewhere, and in no place will this give greater dividends than in the medical department. Therefore, we should have in the physician a pleasing personality, a sympathetic nature, and the ability to smile under adverse conditions.

The third qualification is honesty. A physician must be honest in his opinion, regardless of whether it is adverse to the company or to the employees. Nothing will tear down the confidence of employees in their medical department so much as the feeling that the opinions they receive are biased in favor of the company. An industrial man must guard against being biased in his opinions and he must be diplomatic. In controversial cases a well trained physician will realize that he is dealing with a sick man, perhaps entirely mental, but nevertheless a troublesome case and one in which very often the individual will have the opinions of his fellow workers with him.

The fourth qualification is what can be called an industrial mind. This implies the individual ability to see not only from the standpoint of the company but also from the standpoint of the workers in the ranks, and to view industrial medical work from an economic angle as well as a humanitarian one. From the economic angle the individual with this ability will see the future effects of all preventive work, whereby workers are kept productive for years longer by the early diagnosis of tuberculosis, finding of latent syphilis, changing of occupation among cardiacs, watching lung irritations in sand blasters, etc.; in short, the material benefit of periodic health examinations. From the humanitarian standpoint there is the prolonging of life and making it more happy for the individual and for all those with whom he comes in contact, and benefiting the community and the nation as well. With this he will acquire an insight into the psychology of the worker possessed by no one else within the organization. He will see the relationship between the man's work and his home conditions, which infrequently has a great deal to do with the occurrence of accidents, in which men of this organization are so vitally interested.

The fifth necessary qualification for the industrial medical man should be a willingness to enter into all community health affairs. An ever willing listener to all home conditions, his support should be available for all community clinics, and he should be interested in all school medical work, for the future industrial workers are in our schools today. He should be active in all local medical societies, and on friendly terms with all outside physicians. The reputation of the plant's medical department will hinge largely on the ability of the plant physician to cooperate with the family physicians of the employees. The success of all preventive work within a plant will depend in no small degree on the cooperation of all the physicians in the community, and this can be accomplished if the proper tact is used and it is understood by all. There has been trouble at times, owing to the lack of understanding between plant physicians and family physicians, but I cannot imagine any situation which cannot be handled if there is a thorough understanding before it is undertaken.

Finally, but not least, we must mention adaptability as a very necessary qualification. The industrial medical man must be broad-minded both medically and otherwise; he must be able to change his opinion if circumstances arise demanding a change either for the good of the company or the employee; and he must receive suggestions at all times gracefully no matter from whence they come.

With such qualifications, either evident or potential, any medical man can be assured of hearty backing by the management, and industrial medicine will soon reach the place it deserves in our ever-widening field of industrial relations.

Further opinions on this subject have been quoted by various authorities. For instance, Watkins[6] in 1920 expressed the following view: "It took the medical profession quite a while to realize that the possession of a sound medical education did not, *per se*, qualify a man adequately to carry on the duties of a health officer. The profession has likewise been somewhat slow to recognize that the acquisition of sound surgical technic or skilled diagnostic ability does not qualify a man to carry on the duties of an in-

6. Watkins and Lanza, quoted by Sappington: "Industrial Medicine." *Industrial Relations*, 3: 560-563 (November & December, 1932).

dustrial physician."

Dr. A. J. Lanza[6], who in 1931 was Chairman of the Section on Preventive and Industrial Medicine and Public Health of the American Medical Association, stated in his chairman's address in Philadelphia, in 1931: "Although there are able and experienced industrial physicians competent to deal with any situation which may confront them, one still finds all too frequently physicians who have no real appreciation of the nature and effect of working conditions and only an imperfect conception of the pathology, symptoms, treatment or prevention of specific occupational diseases."

A hasty perusal of these opinions and points of view will lead to the inevitable conclusion that the industrial physician and surgeon who functions properly covers a wide range of activities within and without the organization to which he is attached.

What He Can Be

GOING beyond the realm of routine work, the opportunities for the industrial physician to be of inestimable value to industry and the community are limitless. Some of these opportunities may be listed as follows[7]:

1. *Checking up and estimating the efficiency of the community school health program.* A survey of San Francisco showed that 90% of the pupils of the grade and high schools leave school to enter industry direct. Moreover the personnel of one of the largest commercial houses of the industrial district surrounding San Francisco was found to be composed of adolescents, 65% of the working group being under age 20. Most of our industrial groups come direct from the public schools. These facts present a situation in which there is an unusual opportunity for checking up and evaluating the actual worth of the school health program.

2. *Minor illness studies.* Nowhere is it possible to get such accurate results in the reporting of minor illnesses as in an industrial plant. This has been done for accidents, and may well be applied to illnesses.

3. *Study of physical defects.* Someone has wisely said that a physical examination is of no avail unless the defects found on the examination are followed up and corrected. The increasingly large number of physical examinations in industry presents an unusual opportunity for the study of the occurrence of physical defects in our industrial population.

4. *Economic studies of money and time lost on account of physical disability.* In no other situation in the public health field today is it possible to arrive at so nearly an accurate estimate of the actual cost of the various types of absenteeism.

5. *Mental hygiene in industry.* One of the most important approaches to the solution of the many problems of maladjustment in industrial life is through mental hygiene. Nowhere is there such a great opportunity for prolonged study which this type of health endeavor necessitates, as in the large industrial groups.

6. *Efficient follow-up in the correction of defects found on entrance physical examinations.* In school health work, defect correction is often hampered either by the attitude of the parents or some factor equally as unstable. In industry the exercise of control is possible by appeal to reason and further by arrangements for proper placement. A study of the results of defect correction is thereby made possible.

7. *Periodic health examinations.* A number of the large industrial groups are now advocating the doing of periodic health examinations. some restricting this privilege to the executives and heads of departments, and others doing it on the entire group. The statistical material thus made available will furnish valuable data on which to base many future health procedures.

8. *Scientific study of the early manifestations of degenerative diseases and other types of disability.* On account of the possibility of prolonged observation and frequent check-ups, this opportunity is especially important in industrial health work. Tuberculosis occurs principally in the industrial age group and degenerative diseases certainly have their beginning within this age grouping. Dr. Dublin has called our attention to the fact that mortality from these types of diseases is two to three times as high in industry as in other callings.

9. *Health education.* Perhaps in no other field of health work is the opportunity for health education so easily available. It occurs during examinations, during calls to dispensaries for illness, during the treatment of accidents, during a house call, and may be accomplished through displays on bulletin boards, in the plant magazine, in the pay envelope, and through motion pictures and various other means.

10. *Advisory service.* Recently some of the large industrial medical services have empha-

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7. Sappington, C. O., M.D.: "The Industrial Physician's Opportunity in Preventive Medicine." *Transactions of the National Safety Council*, 1929, pp. 196-199.

sized the point that many industrial employees need advice as to what should be done for certain types of disabilities. Many do not know where to get adequate medical attention or specialists' services. Industrial medical departments can render great and invaluable aid by pointing the way and supervising the employee to see that he gets adequate care.

The industrial physician should take more than ordinary interest in the economics of industrial health and industrial health administration. Because health services have not yet been applied to more than about 4% of the existing industries in the country, there are great possibilities for the future reduction of the tremendous waste occasioned by ill health and sickness[8]. Economically this means that, assuming the average wage loss per person per year is $28 for sickness alone (based on an average wage of $4 per day and a loss of seven days per person per year) medical service in industry costs, according to figures gathered by several national organizations, an average of $7 per employee per year; and health services have reduced absenteeism from 25 to 50%, and possibly more in some instances. Thus it would seem rational that a health service would not only pay for itself, but also would be instrumental in reducing a portion of the tremendous loss annually experienced. In other words, a $7 per capita investment per year might reasonably be expected to yield from $7 to $14 in return. However, it should be kept in mind that medical and health services in industry will not give an immediate return, for instance, within a period of one year. Most records show that such a service must be operating for a period of two to three years before such results are obtainable. Nor is it wise to believe that all plants no matter what size should start with a full-fledged service; the department should be built gradually, increases being made in accordance with the needs of the group.

The figures mentioned have reference to wage losses alone; other items of losses not being included, but would be saved through the proper type of health service, properly administered. Of inestimable value would be the feeling of loyalty and security inculcated in the employees, knowing that adequate provisions have been made for the prevention and care of the most common type of fortuitous occurrence — sickness.

Physicians are supposed to be endowed with more than the usual amount of humanitarianism. In industry, however, it is probably true that the greatest chance for humanitarianism is afforded the physician who sees his opportunities and makes the proper use of them. Such a point of view calls for real cooperation between management and worker and the physician in the medical program in industry[9]. A few years ago Owen D. Young, in an address at the dedication of the new building of the Harvard School of Business Administration, said in part: "Organized business has been quick to take the advantages of group action, but has been slow to assume group responsibilities. We must deal, not with the limits to which men may go without physical exhaustion, but the limits within which they may work with zest and spirit, and pride of accomplishment." Needless to say, zest and spirit and pride of accomplishment are more often than not associated with a fair degree of health, both mental and physical. Clearly then, the very essence of cooperation between worker and management in industrial health work consists in definitely humanizing industry. In working out this process of humanization, it seems that it is the responsibility of the management to provide a safe and healthy place in which employees may work. On the other side, it is the responsibility of the employee to cooperate with the management in every possible way to secure the above results. Too often the employee believes that there is an ulterior motive back of the provision of a health service by the management. Of course this is not true, because good health is good business from any angle. Many employees fear that they will be discriminated against, or that they will lose their jobs. The management should make it definitely known that this is not the object of a health service. The primary purpose is to have a working force that is as nearly 100% healthy and efficient as possible. This will work for the good of all concerned, if properly and adequately administered.

Of considerable importance when listing the opportunities of the industrial physician is the recent emphasis which has been placed on occupational diseases and their control by appropriate legislation. This situation now and in the future will act as a direct incentive to employers to take a very serious interest in the provision of a healthy environment in which their employees

8. Sappington, C. O., M.D.: "Does Industrial Health Work Pay?" *Illinois Journal of Commerce*, March, 1932. (Reprint).

9. Sappington, C. O., M.D.: "Health Work Humanizes Industry." *National Safety News*, November, 1930, p. 10.

can work; it is also heightened because of the increasing tendency to compensate for more occupational diseases and to provide for complete coverage in various states. Various codes are also making their appearance and this has placed an added emphasis on the necessity for both physicians and employers to use more accurate knowledge and more accurate measurements in the estimating of health hazards in various processes in manufacturing. The industrial physician of the future, therefore, if he is to function adequately must take a gradually increasing interest in medicolegal affairs and be able to assume the proper role in the giving of scientific evidence before commissions and courts.

The essential sociological differences between the private practitioner in medicine and the industrial physician have heretofore received less emphasis than they deserve.

The private practitioner deals almost wholly with individuals, with individual reactions, with individual problems; contrariwise, the industrial physician deals with groups, with group reactions and associations, and must have the group idea firmly implanted within his mind.

This is in line with the development of our present social structure: group work is the order of the day; we see amalgamations and consolidations going on daily; medical work of the future will quite likely be largely with groups.

Because many social changes are becoming apparent, it is reasonable to believe that the industrial physician will more frequently become the arbiter of difficulties between employers and employees, than has been the case in the past. The basis for this belief lies largely in the concept that the physician must see the point of view of both sides in his dispensing of scientific service to the organization and its employees, and further, because of the inherent diffiiculties which have arisen quite recently between employers and employees it is also reasonable to think that industrial relations programs and technique will be very adversely affected by such circumstances.

Finally, the industrial physician has an opportunity not comparable in any way to that of the private practitioner, in his economic influence in industry.

In dealing with groups, he has the ability to control both medically and economically larger numbers of people than the private practitioner can see over a period of many years. This causes the recommendations and the judgment of the industrial physician to be a considerable factor in the making of decisions regarding the type, quantity and quality of equipment and supplies needed by industry in ministering to the medical needs of employees. These conditions, therefore, place the industrial physician in an enviable position as a medical economist, which will be more greatly emphasized in the future.

Medicolegal Status of Syphilis

THE DEFENDANT insurance company issued to the plaintiff a policy of life and sick benefit insurance. The policy provided that the insurer should not be liable for benefits on account of "any venereal disease or disease of venereal origin." The plaintiff suffered from syphilis, syphilitic aortis, and hyertension. He sought to obtain benefits under the policy, contending that the "venereal diseases" excluded from the coverage of the policy were only such as were contracted through sexual intercourse, and that he, being an old man, and long since impotent, had not contracted and could not have contracted his syphilitic infection in that way. The trial court dismissed his suit, and he appealed. It is quite likely, said the Court of Appeals, that originally the term "venereal," as applied to diseases, was intended to describe only such diseases as result from sexual intercourse, for until medical science recognized the bacterial origin of disease, the communication of venereal diseases by any other method must have been unknown. The germs, however, that cause the so-called venereal diseases do not depend on sexual intercourse for their spread; they may be disseminated by a handshake, a kiss, a common drinking vessel, and in other ways. Consequently, when we use the phrase "venereal disease" today, we do not necessarily mean—as was once the case—a love or sexual disease. The term means rather one of several diseases that are still so identified with sexual intercourse as to be best described by the epithet venereal, although that epithet has now lost some of its appropriateness. The Court held that an insurance policy which excludes venereal diseases from its coverage imposed no liability on the insurer to compensate the beneficiary under the policy for the effects of syphilis, no matter how that disease may have been acquired. A venereal disease, whether it originates from sexual intercourse or from shaking the infected hand of a friend, is nevertheless a venereal disease.—*Coleman v. National Life* N *Accident Ins. Co. (La.)* 145 So. 298.—J. A. M. A. (August 19, 1933).

The Medical Department Manual

—The Complete Handbook of Organization, Operation and Routines Representing Actual Experience and Practice of 20 Years—

Section I. History of the Medical Department

by

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THE COMPLETE manual of organization, operation and routines of the medical department serving the:
Chicago Rapid Transit Company,
Chicago, Aurora & Elgin R. R. Company,
Chicago, North Shore & Milwaukee R. R. Company,
Chicago, South Shore & South Bend R. R. Company, and
Public Service Company of Northern Illinois,
prepared by Hart E. Fisher, M.D., Chief Surgeon, is to appear in forthcoming issues of *Industrial Medicine.*

Painstakingly developed during 20 years of pioneering in industrial medical practice, the manual can be accepted as a safe guide to follow in establishing and maintaining employee medical service.

Sections to appear in the following numbers will include:

Sec. II. PHYSICAL PROPERTY OF THE MEDICAL DEPARTMENT
Sec. III. PERSONNEL OF THE MEDICAL DEPARTMENT
Sec. IV. FUNCTIONS AND ROUTINES
Sec. V. THE CENTRALIZED MEDICAL DEPARTMENT; ITS DIRECTION AND FINANCIAL SET-UP
Sec. VI. RELATIONS WITH OTHER DEPARTMENTS IN INDUSTRY
Sec. VII. RELATIONS WITH MUNICIPAL, STATE AND FEDERAL AGENCIES
Sec. VIII. MEDICAL DEPARTMENT FORMS
Sec. IX. FIRST AID IN INDUSTRY
Sec. X. HOW THE MEDICAL DEPARTMENT CAN BE A FACTOR IN THE REDUCTION OF ABSENTEEISM
Sec. XI. SANITATION IN INDUSTRY
Sec. XII. THE NURSE IN INDUSTRY
Sec. XIII. RESEARCH IN INDUSTRIAL MEDICINE AND SURGERY
Sec. XIV. INDUSTRIAL MEDICINE AND SURGERY; ITS PAST AND PRESENT STATUS
Sec. XV. REQUIREMENTS OF A COURSE OF INDUSTRIAL MEDICINE AND SURGERY
Sec. XVI. CLASSIFICATION OF PHYSICAL DEFECTS, TRANSPORTATION EMPLOYEES
Sec. XVII. GENERAL INSTRUCTIONS TO EXAMINING SURGEONS
Sec. XVIII. CLASSIFICATION OF PHYSICAL DEFECTS FOR THE REVIEWING SURGEON
Sec. XIX. REGULATIONS AND REQUIREMENTS GOVERNING PHYSICAL EXAMINATIONS
Sec. XX. INTERPRETATION OF PHYSICAL DEFECTS OF EMPLOYEES FOR DEPARTMENT EXECUTIVES

THE contents of this Manual have been compiled from monographs and letters written in answer to requests for information as to the organization, operation and routines of our Medical Department from steam and electrified railroads, hospitals, public utility companies, insurance companies, and industrial and mercantile companies, both here and abroad.

The wide variation in the nature of industrial medicine and surgery, as covered by this Medical Department, makes its scope of work far reaching, and there is no other similar organization serving transportation, gas, electric light, power and high-speed motor coach operation in existence today under the control of a centralized medical policy. It is the fact that our activities cover the different industries that make our methods in demand by other companies, and in this way serves to help others profit by our experience.

The contents of this Manual are arranged so as to give a general outline of the organization of a Medical Department, and this same plan can be made to expand or contract to fit industries employing from a few hundred to thousands of employees. The information as compiled represents actual exrience and practice during the period from 1913 up to now.

In order to avoid a bulky manual, it was seen fit to use the forms which are employed by the Chicago Rapid Transit Company rather than try to incorporate the forms of all the other

companies. The general scheme is in vogue in all the companies served. Any additional information desired will be gladly furnished upon request.

It is sincerely hoped that from this Manual information may be received by those contemplating a medical policy of employee health conservation that will be of value to them and save them errors that might otherwise cause some concern in employee relations.

The sane inauguration of any medical policy regardless of the size of the company is to begin in a small way taking up that medical condition with the most importance, and then putting it into effect. Only after one medical feature has been established and has proved successful, should the next feature be started. When any feature has been made a part of an industrial health policy it should be kept in operation for at least one year to give it the opportunity of proving its value. Rushing into print with the various medical features of any company, until a reasonable amount of time has been devoted to their study, may later cause embarrassing retraction.

IN 1913, following the consolidation of the four Elevated railroads in the city of Chicago under unified control and operation, it was decided by the management that there was need of a definite medical policy to meet the medical and surgical needs of each of the railroads and still be broad enough to cover the combined properties as a whole. Each railroad had different operating and physical conditions that had to be standardized to meet unified operation, and this was equally true of the different medical methods in vogue in each company.

The president of the Elevated railroads, after a study of the situation, decided on a medical plan for the employees under his direction. He employed the present Chief Surgeon to enter upon the task of putting this policy into actual operation. Haste was not imperative in this plan. Time was taken to ascertain the most important feature to be studied and put into effect. The medical methods in force on the various steam and electrical railroads in this country were given careful study and discarded as not sufficient to meet the needs of the Elevated companies.

The first phase of the medical policy to be undertaken was the physical examination of all applicants for employment, under definite standards of physical requirements to meet the needs of safe, high-speed train operation. It is true that there had been physical examinations of employees by outside physicians prior to the installation of the Medical Department, for which the prospective employee paid the fee. This was unsatisfactory as it was usually superficial medical inspection, requiring but little of the physician's time. Sentiment was allowed to influence the doctor's approval or disapproval of the applicant. The physicians were working in the dark as to what constituted physical fitness of employees in the different classifications of work in the railroad transportation industry, and they often approved applicants for employment who later became definite hazards in their work. As a result, each examining physician had his own conception of what constituted physical fitness. This permitted applicants to enter the service who lacked the physical stamina necessary for the work to be performed. Rapid, high-speed transportation, such as that operated by the Elevated Lines, made it imperative that only men as nearly perfect as possible be employed if the customers, the travelling public of Chicago, were to be carried efficiently and safely to and from their daily work. The responsibility was too great to be taken for granted and some plan for definite security was essential. It was seen, therefore, even at this early date, that an employee in good health gave assurance of safe and efficient work.

Each class of labor in the industry was studied and a definite standard of physical requirements was established for each. The more hazardous the occupation, the more responsibility the position carried, the more stringent the physical standards set for those jobs. Information was also secured from 12 of the large steam railroads in the country as to their physical standards and methods of examination of applicants. As the requirements of these steam railroads did not meet with conditions of operation on the Elevated railroads, it was necessary that we set up new standards. After a job analysis was made, a definite classification was arrived at and set standards of physical requirements and disbarment elements were compiled.

Critics in the railroad industry at that time assured our officials that such stringent physical standards would have to be changed drastically if we expected to secure sufficient employees to fill our needs. The same standards that were set in 1913 are in force today, and even at the time of the labor shortage during the war it was not necessary to lower them. Today the list of applicants for positions with the Chicago Rapid

Transit Company is inexhaustible. These standards and disbarment elements will be found complete in this Manual.

AFTER the adoption of our standards of physical requirements each new applicant was made to conform to the rulings. The prospective employee was given a thorough physical examination before he was employed, so a definite record was obtained of the physical make-up of the men who were to operate the trains that were safely to carry the people intrusted to their care.

The problem of initial examination being settled and in practice, the second phase of our medical policy was started, namely, that of re-examination of all the old employees as to their physical fitness to perform the work in which they were daily engaged, from the standpoint of safety both to themselves and their charges, the travelling public. The labor unions were made acquainted with the purpose of aiding the employee to remain physically fit for his work, and they cooperated with us to the fullest extent. Once every two years, at first, was thought to be satisfactory as to the frequency of this re-examination, and on schedule each employee in his turn presented himself for re-examination. His defects were explained to him and he was urged to seek the services of his own physician to have them remedied. The value of this pioneer work in medical periodical re-examination is proved by the present day trend towards periodical re-examination of employees.

We were the first company engaged in railroad transportation to re-examine its employees periodically by a thorough physical examination. This medical survey was of such great value in maintaining the health of the employees, detecting incipient disease and potential accident makers, and reducing absenteeism from work on account of illness, that the company has continued to employ that system since its first trial up to the present time.

The management accepted only healthy individuals in the service, and it was imperative that these same employees be maintained in as healthy a state as possible—from the standpoint of safety as well as economic value in a decreased labor turnover. The employees having defects were examined at more frequent intervals and were kept under the constant observation of the Medical Department, and from this observation a new or third phase of the medical policy was developed.

Every employee, who was absent from work on account of illness, injury or leave of absence for a period longer than one week, was obliged to undergo a re-examination before he resumed his regular duties, which prevented sick or physically unfit employees from resuming work until they were in a safe condition to do so. This requirement may seem drastic to the mind of the layman, but its adoption by these companies has demonstrated its great value in the prevention of accidents.

As the physical re-examination grew more extensive and its requirements more exacting, it became necessary to provide a hospital car, constructed on the plan of a doctor's office and waiting room in order that the examining facilities could be carried to the place of employment and thus save the employees the time and inconvenience of reporting to the Central Medical Department. A very beautiful hospital car was secured, fully equipped with all the essentials of a physician's office, and sent on schedule to each terminal shopyard, where the employees reported for examination. This placed the examination on a more efficient and dignified basis. The car has been in daily use ever since and is in charge of a medical personnel. It is so equipped that it can be transferred to all four of the electrified railroads in this work. Full details of the hospital car and its work are given elsewhere in this Manual.

When the management was assured that the new employees who enter the service of the company were physically fit for the work they were to do, and that the medical survey was safeguarding the men after they were in the employ, attention was next directed toward improving the method of caring for the injuries that occurred to the employees in their daily work. Prior to this time, the treating of employees' injuries was left to the general medical profession. There were many advantages as well as disadvantages in this arrangement to the company, the employee and the doctor. The city of Chicago was zoned in districts adjacent to the Rapid Transit Lines and doctors were listed who were to be used in time of emergency to care for customers and employees. Hospitals were also listed and orders were issued to take the injured to the hospital nearest to the scene of accident. This assured that the injured person would receive competent treatment and hospitalization as immediately after the accident as possible.

The personnel of the Medical Department consisted of surgeons, who, by the nature and abundance of their daily work and their acquain-

tance and experience with injuries which were most liable to occur in the transportation industry, were better qualified to treat such injuries than outside physicians who might see only an occasional case. Our surgeons were also better able to check up the progress of the patient and return him to some income-paying work sooner than the occasional doctor, and to judge whether or not the employee was fit to resume his duties, with their knowledge of the nature of the patient's work. They were advised as to the terms and requirements of the workmen's compensation act and were situated to conform to this act to the fullest extent.

The gathering together in a Central Medical Department of surgical cases of employees permitted greater ease in treatment and in maintaining the patient under observation. It also permitted employees to receive specialized attention, such as x-rays, fluoroscopic examinations, laboratory tests, physical therapy treatments, and other services which were difficult to be had if under the care of outside physicians, and then at great expense and after delay.

All ambulatory injury cases, when practical, were sent to the Medical Department for treatment, and cases that received emergency treatment elsewhere reported when their condition permitted. In addition, our staff of outside surgeons, when their ability was proved, were allowed to retain the employee under their treatment until he was ready to be discharged. It is essential that direct supervision be maintained over injured employees and to know that the surgeon in charge of the case is competent to deal with the condition at hand.

Surgical attention to employees in hospitals was the next phase of the Medical Department's activities to be undertaken. Contact and relations were made with ethical, first-class hospitals to give immediate and efficient service to the injured employee or customer who entered their institutions. The personnel of the Medical Department was permitted to treat, examine and operate in the hospitals and members were placed on the various staffs. This contact assured the hospitals that their bills would be paid promptly and without discussion.

The value of surgical attention by the Medical Department to employees became so apparent to the legal and claim departments of the company that this same service was requested in customer or public liability cases.

The old bugaboo, that the treating of these cases by company doctors would be detrimental to the company if they came to litigation, was soon dispelled. Today the personnel of an ethical Medical Department of a bonafide industrial organization have just as good standing in court as other doctors, and when they tell the truth they have nothing to fear. Records of the company show that of the cases of this type that go to trial, the proportion treated by the Medical Department is smaller in comparison with cases treated by outside physicians. The reason for this showing is that friendly public relations are desired by the company. Personal contact is had with the claimant, his physician is consulted, and no settlement is effected with the patient until he is fully recovered or his condition cannot be improved. All parties concerned must be mutually satisfied as to the disability resulting.

THE NEXT phase of our medical policy to receive the attention of the Medical Department was the problem of accidents to employees or customers occurring in remote or isolated localities where medical men were not readily available in emergency, or if available, when a long time had necessarily to elapse before their arrival at the scene of accident. This delay often caused unnecessary suffering and risk to the injured person, and in many cases death resulted from the delay in receiving immediate attention. The value of first aid treatment by employees to the injured then became apparent to the management.

On account of the disfavor prevalent in industry against laymen doing first aid work, due to the deplorable results from their inefficient efforts, the Medical Department first made a very careful investigation of the advantages and disadvantages of the first aid work in industry at that time. One shining factor of truth was revealed — that nowhere was there established a systematic first aid procedure. Furthermore, no apparent effort was being put forth, either by the medical profession or those in industry, to study this problem, but where first aid was in vogue it was merely a side issue.

This gave encouragement to work out a definite plan to establish a first aid system on the properties under the control of the Medical Department. Employees with intelligence and mental alertness were selected and enrolled in first aid classes. They were taught the use of the facilities for making the injured comfortable, the methods of transportation of the injured, the control of hemorrhage, the application of fracture splints, bandaging, and the application of

artificial respiration in cases of drowning, electric shock, and apparent asphyxiation from gas. These students were drilled in the actual work, they studied from textbooks; and, most important of all, they were taught their limitations in this work. Next in order came the selection of a suitable first aid kit which would contain the equipment necessary for the injuries most liable to occur in the industry. Graduates of the first aid school were trained in the proper use of these kits and were adept in the use of the same before they were allowed to render aid in time of emergency. First aid kits, together with blankets and folding army stretchers, were installed at numerous locations over the entire property and were designated by first aid markers for the information of employees. Frequent inspection of these outfits, to keep them in a fully equipped condition, was established and all first aid treatments were carefully checked.

It was soon proved conclusively that by system, education, inspection and cooperation, first aid work could be successfully undertaken by an industry. The immediate results were a diminution in the number of infections from trivial wounds, a marked reduction in fatalities from electric shock, and a decrease in the amount of time required to get a patient to a doctor or hospital. Very valuable, also, was the effect on the employees in exercising the spirit of caution at work and in looking after their personal health. A full, detailed description of our first aid work is given in this Manual.

Keeping in mind the fact that environment has a very decided effect both on the health and efficiency of employees, the sanitation phase of the medical policy of the company was next established and it is still in force at this time. Periodical sanitary inspections are made of the entire physical properties of all the companies served by the Medical Department, and control of sanitation is vested in this department. Each department is held responsible for the sanitary condition of its properties, and they cooperate to the fullest extent with the Medical Department in maintaining them in as healthful a state as possible. Inspection is made of all properties as to illumination, ventilation, heating system and toilet facilities. Supervision of the handling and serving of food in dining cars, restaurants and concessions operated by the different companies is conducted in a strict manner. Certification to the state and Federal health authorities of all water used for drinking and culinary purposes is made quarterly, and certification is made also as to the source and quality of foods served. The employees handling the foods are carefully examined to detect disease. Employees whose work requires the use of paints, chemicals, compounds, greases and solutions, are safeguarded from harmful effects by investigation by the Medical Department, and a rigid medical inspection is made monthly of employees handling lead and zinc paints and the condition of their health is reported to state and Federal health authorities. Supervision of the cleaning and disinfecting of the rolling stock of the railroad companies is also vested in the Medical Department.

AS THE Medical Department continued its treatment of injuries received by employees when at work, employees, having confidence in our doctors from the services so received, commenced to request treatment for injuries and illness occurring outside the line of duty. This service was restricted to examination, diagnosis and treatment of employees whose financial means were limited. Where they were able to have the service of their own family physician, they were not treated but referred back to their own doctor. This service has not been abused by employees and only worthy cases have been treated by this department. It is true that many rare and vague conditions of diseases in certain employees received treatment at this department but only where they had been unsuccessful in obtaining relief elsewhere. In many cases employees who were able to pay for treatments and operations became private patients of doctors in the Medical Department. This has not impoverished the general practitioner, as there is sufficient work for all, and every doctor has the right to have private patients if he secures them in an honest, ethical manner.

One enjoyable feature of this work is the ability to extend to the employees the use of diagnostic facilities, such as radiographic, fluoroscopic and laboratory examinations, and to secure for them specialized services of those most competent in the respective lines in the medical profession.

In the daily functioning of the industries, conditions come under the observation of the Medical Department which arouse the research instinct, and our staff of doctors, who genuinely desire to best serve those employing them, take advantage of the opportunity that is given for following up research on different medical and surgical dressings, a non-adhering gauze dressing was perfected. From the study of the value of

paraffine treatment of burns as compared with all other known treatments, our own routine burn treatment was developed. Experimentation was made as to the greater value as an antiseptic of iodine or mercurochrome and no advantage was found in one over the other, except our preference for iodine. Safety spectacles, non-glare glasses for welding and protection from electric flash of sleet, were successfully perfected. Experimental work in increased arterial tension is now in the process of study. The wealth of material and the immense library of record cards of cases on hand present a great opportunity for the personnel so interested to study a wide variety of diseases.

As time passed, new companies engaged in different types of operation came under the service of the Medical Department and their respective medical policies were coordinated with the rest, and on account of the difference in the nature of their products, each company required study and new procedures. For example, one such industry is high-speed motor coach operation on public highways, with its attending hazards. The Medical Department is at work at this time on the problem of the mental hazard in this industry and procedures are fast rounding into shape to correct this condition. Electric and steam railroad transportation, gas, electric light, power and motor coach operation, are the various activities in which our companies are engaged.

Health and accident insurance in the form of employee's sick benefits came under the scope of work of the Medical Department in the course of its expansion. All claimants are examined and their cases passed on before payment of claims is made. Review of the claim, furnishing of supplementary reports and examination of claimant before he resumes work are necessary in this insurance work. In addition, each of the companies has an Employees' Mutual Benefit Association, which calls for the same service as that rendered in insurance cases.

The employment and safety departments claim a proportionate share of the time and efforts of the Medical Department in the setting of employment standards, the examination of prospective employees, and in detecting the potential accident maker. The Medical Department also works in close cooperation with the claim and legal departments in the litigation of cases both in the courts and before the Industrial Commission, aiding in the preparation of the cases for trial and securing competent medical testimony of the ethical type.

In large movements of passengers, outside of the ordinary, daily routine, the Medical Department is called upon to give service in time of need. Take as an instance the Chicago Rapid Transit Hospital Unit Number 1, which functioned at the Eucharistic Congress in 1926, when a complete 100-bed hospital and hospital train were established adjacent to the terminal at Mundelein, Illinois. This vast transport of people did not result in a single injury on the company's property, still, owing to the great crowds on the Seminary grounds, the Hospital Unit treated over 1,700 bed cases in 24 hours. The hospital train consisted of two completely equipped operating suites sufficient to meet every emergency. The 100-bed hospital was housed in large army, ward tents and was completely equipped. This unit consisted of a personnel of 100 doctors, nurses and first aid men, and two motor ambulances. The skeleton organization of this unit is still in operation and can be enlarged on short notice in time of disaster. This organization was formed more from the standpoint of public relations than transportation hazard. The visiting nurse system is a phase that developed during the war at the time of the influenza epidemic, and is today under the jurisdiction of the Medical Department. Calls are made daily on sick and injured employees to see that they are receiving the necessary medical aid and that they have financial assistance. This service is in the form of sunshine calls more than actual nursing aid. Only registered nurses are used in this work.

The Medical Department is continually called upon to give talks before the lay trade and medical societies concerning health in industry. Papers are written for trade and medical publications. The combined audiences before which the personnel of the Medical Department appeared in 1927 numbered over 150,000 people. Once each month a dinner and round-table discussion are held at one of the leading hotels at which the business and cases of the department come up for review. This is the training ground for public speaking on the part of the personnel of the Medical Department and in turn each doctor must conduct a meeting.

The Medical Department commenced its operations in a one-room, one-desk, one-man office and has grown until at the present time it occupies a 10-room suite in the Chicago Trust Building in the loop of Chicago. The offices are equipped with extensive x-ray, laboratory, medical and surgical equipment to meet all conditions.

The number of cases treated has increased from 2,000 in 1913 to over 73,000 in 1928, including cases of all kinds, such as examinations, treatment, etc., and the number of companies served by this department has grown from one in 1913 to a minimum of nine at this date. The personnel of the Medical Department consists of six physicians and surgeons, four nurses, two clerks, and a first aid director. Our doctors are graduates of first class medical schools, have served interneships, all have done post-graduate work in the respective specialties for which they are employed, and are required to belong to and take an active part in the medical societies in their respective localities. In addition to their work in the Medical Department, the doctors work on a fee basis on cases outside of the department. No medical students are employed in this work and each patient is treated as a private and not a dispensary patient.

In conclusion, the Medical Department today stands in the eyes of industry as a visual example of what is possible of achievement in industrial medicine and surgery when systematic and business methods, plus a competent medical personnel, are given the opportunity to develop on a broad-minded, ethical basis. It proves what can be done for industry by the reduction of absenteeism from work on account of sickness, by the reduction of the accident rate, and by the reduction of the severity rate of injury. It assures a healthy body of employees, and guarantees the employee that competent medical and surgical service will always be forthcoming in time of emergency. It conserves the life of the employee through first aid efforts rightfully directed; it improves the working environment of employees and environment of customers; and it makes for mutually satisfactory industrial and public relations, without which no industry is successful. The most important factor of all is that a Medical Department, operated under such ideals as prevail in our companies, dispels the former adverse opinion of company doctors and company medical departments.

There is room in industrial medicine and surgery today for vast improvement in the conditions if the ideal is reached in better surgery for those injured in industry. There is need of this important subject being included in the curriculum of medical colleges, of a clinic or teaching center where those already out of school can seek information and instruction as to how best to do industrial work, of hospitals equipped efficiently to handle industrial patients. There is need of standardizing medical departments by some national body as hospitals are standardized. There is marked need of improving the standard of surgery as it is now being done in industrial clinics.

This branch of medical science is a distinct specialty in itself and requires greater tact, application and ability than does private practice, by reason of the fact that the industrial surgeon is constantly under the observation of his company and its family of employees. His mistakes are soon broadcast and a change of surgeons will be forthcoming if these errors are frequent, while in private practice these shortcomings and errors are not so apt to become common knowledge on account of lack of contact between private patients.

Cooperation of the medical profession as a whole is essential, as industrial medicine is still in its infancy and business and financial interests are now awake to the great value that can accrue to their business by an established medical policy.

The future will see great strides and changes in medical service, especially in industry, and it behooves the medical profession to cooperate for the betterment of this valuable service to those engaged in industry.

Dust Problems in the Pottery Industry

THERE are two generally recognized health hazards in the manufacture of pottery—lead and silica dust. An experimental study of dust conditions was made in a plant to serve as a guide to remedial measures.

Dust particle count was determined, using the Greenburg impinger, likewise dust weight determinations. These were made in the jigger shop (clay shop), separate finishing room, stove rooms, and kiln placing rooms.

The average dust count in the clay shop was about 150 particles per c.c., or less than half the strictest requirements of the Public Health Service, and the measures instituted again cut this figure in half. In the finishing room, dust counts of 228 particles and 5.9 mg. per cubic foot, without suction, were reduced to 129 and 1.2 respectively by the use of a new finishing bench with suction. In the kiln placing room the company in question has used kaolin instead of quartz for placing or "bedding" purposes, thus avoiding the flint dust hazard here. — Edward Schramm, *J. Am. Ceramic Soc.*, 16, 5:205-13.— Abs. *Am. Jour. of Public Health* (July, 1933).

Cardiovascular Disease and Industry

—V. The Heart in Thyroid Disease; and VI. Effort Syndrome—

by

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THYROID DISEASE (adenoma, exophthalmic goitre or myxedema) may cause changes in the cardiovascular system. With toxic adenomas and exophthalmic goitre, there is usually more or less hypertension and tachycardia and not infrequently congestive heart failure or failure due to one of the arhythmias or to angina. Thyroid dysfunction may in some instances be the principal etiological factor even when there is no change in the thyroid that can be found on physical examination. Thyroid disease is more common in women than in men and so is not as important to the physician in industry as to the physician in private practice. However, many women are employed in some industries and in office work in almost all cases and thyroid disease is not rare in men. The cardiovascular changes in so far as they are due to the thyroid disease disappear when the cause is removed whether it be an hypo- or a hyperfunctioning thyroid.

It is therefore important that the physician in industry always consider the possibility of thyroid disease as an etiological factor when heart failure is found. He should also if the industry is located in the "goitre regions" advocate the best methods for the prevention of goitre. The presence of thyroid pathology, if not associated with toxic symptoms, should not prevent the employment of an individual. Such an individual should, however, be carefully watched for the first symptoms of dysfunction. When these arise, employees should be given leave of absence until the condition is corrected.

As organic changes in the heart and blood vessels do not appear to result from hypo- or hyperthyroidism, heart disease due to thyroid disease is one form from which recovery may be complete. However, not infrequently, thyroid disease may develop in individuals having rheumatic, arteriosclerotic or hypertensive heart disease. In such instances, the correction of the thyroid pathology only removes a factor that is perhaps the cause of the onset of symptoms of heart failure; its correction does not remove the other etiological factors or alter the pathological anatomical changes already present.

Thyroid disease is of interest to the physician of industry not only because of its direct effects but also because of its effects on the heart. He should be active in its prevention. He must also be on the watch for it as an etiological factor in heart failure, congestive, anginal or that due to an arhythmia.

EFFORT SYNDROME is the term used to describe a condition that is frequently found. The patient has tachycardia, palpitation, breathlessness or precordial distress on slight exertion even though there is no demonstrable cardiac pathology. It is most commonly met with in those who are recovering from acute infectious diseases such as the common cold, influenza, pneumonia, tonsillitis, etc. It may be the presenting symptom in chronic infections such as pulmonary tuberculosis. In these instances it is due to the effects of toxins on the myocardium, plus enforced physical inactivity. As a rule these conditions do not cause organic change in the heart and as a result recovery is prompt and complete. However, in the presence of organic heart disease of any sort, heart failure symptoms may develop. In fact such infections rather than mental or physical over-exertion are the most common and some believe the only causes of the onset of heart failure in the absence of thyroid disease or coronary thrombosis. It is a fact that heart failure as a rule develops during or immediately after the months during which the incidence of acute respiratory tract infections is highest. The anemias, both primary and secondary, may also be causes of this syndrome. The physician is often consulted because the anemic individual believes that because he has dyspnoea or precordial distress on slight exertion, he has heart disease.

This syndrome is frequently present in those who have cardiac neuroses. Such a neurosis probably is more often due to mistaken diagnosis than to anything else. The physician hears a

murmur, states the patient has heart disease, frightens him, prescribes limitation of activity, rest, diet and even cardiac drugs; the patient soon has a cardiac neurosis which is most difficult to overcome but has no organic heart disease; or the pulse is too slow or too fast; the blood pressure too low or a bit too high; the patient is overtreated and the neurosis develops. Less frequently it develops because a relative or intimate friend actually has heart disease. The physician must be sure of his diagnosis when he states that a patient has heart disease or he may do a great deal of harm.

"Soldier's heart" or neurocirculatory asthenia is another condition in which the effort syndrome is found. This condition is apparently more common in men than in women. However, it is rarely diagnosed except in times of war when many are drafted into military or naval service. However, the physician who knows this condition will find it just as common in times of peace and will find that it is by no means rare in women. In civil life those who have neurocirculatory asthenia become clerks, stenographers, teachers, professional men or women and not manual laborers. They avoid the occupations that might cause the symptoms to appear and so do not have them; but the minute they are forced to unusual mental or physical effort the symptoms develop just as they do when they enter the army or navy. In this condition there is no organic heart disease, no thyroid disease, no acute infectious disease and no anemia to account for the symptoms; but a constitutional lack of reserve. Commonly these individuals are of the asthenic habitus; often they are finicky eaters, may have a chronic vitamin deficiency; they have more foci of infection than do normal individuals; they resemble the malnourished (not the under-nourished) child.

As those with effort syndrome in addition to their subjective symptoms may have some tachycardia, abnormal blood pressure reactions, and systolic murmurs, the diagnosis is not simple yet should be more accurate as the asthenic group are especially apt to develop neuroses of all sorts. The physician in industry must use the utmost care in managing such cases for they are the ones who make many of the claims under the workmen's compensation acts; claims that are based on functional changes and so are much harder to properly adjudicate than are those based on anatomical changes.

It is then evident that effort syndrome constitutes a symptom complex that the industrial physician must consider of utmost importance. When this syndrome is met, he must be most careful in the management of the case and must be most accurate in his diagnosis especially from the point of view of etiology. Though the incapacity is slight, these individuals are apt to cause much trouble. However, they do fit well in positions that are not arduous, that are routine in character and not responsible. Such individuals rarely rise from the ranks but rather fit themselves into a corner where they are able to carry on until retired because of old age. This syndrome may also arise as the result of the inhalation or ingestion of various poisons, metallic, crystaline or gaseous. Exposure to methyl chloride may give rise to changes in the heart, functional or anatomical depending on the amount inhaled, that give rise to this syndrome or even to heart failure. In some instances the syndrome has persisted for months before recovery took place. The pulmonary fibrosis found in pneumokoniosis throws extra work on the right heart and this symptom complex develops. In those with pneumokoniosis who do not develop pulmonary tuberculosis, these are usually the first symptoms to arise. The pulmonary fibrosis resulting from some of the war gases such as mustard gas has caused this syndrome. So from another point of view, effort syndrome is of the greatest importance to the physician in industry for occupation or conditions of work may be the actual etiological factor. All of the poisonous substances that are known to have caused this syndrome should perhaps be enumerated here. On the other hand from certain points of view, it may be more discreet to generalize and just to call attention to the fact that it is possible for this syndrome to develop as a direct or indirect result of some industrial hazards. We are just beginning to appreciate some of these and there may be others of which we are not as yet aware.

THIS is a field of increasing importance to the physician in industry. He should study the situation in the plants under his jurisdiction to make sure that all the necessary preventive measures are being taken; that the measures he has prescribed are actually being practiced. As many of the substances under consideration are in some states not included under the workmen's compensation laws, the employers should be particularly interested in the prevention of the organic or functional changes in the heart that result from their ingestion or inhalation.

So effort syndrome, a symptom complex, which may be the result of infections, of anemias, of constitutional deficiency or of industrial hazards is of greater interest to the industrial physician than many of the organic diseases of the heart; of much more importance than to the physician in private practice who is interested chiefly in the alleviation of the symptoms, who is not particularly concerned with the question of the employer's liability.

Privileged Communications

PALMER went to work on his automobile. Three hours later he was found lying on the floor of his garage, unconscious, face downward, with bruises on his forehead and nose. Two windows of the garage were open, but the large doors were closed. When he was found, the motor of his automobile was running, and smoke and fumes pervaded the garage. Two physicians attempted to revive him but failed. Palmer was insured under an accident insurance policy which excluded from its coverage death from cerebral hemorrhage and from asphyxiation by carbon monoxide. Suit was brought.

On behalf of the plaintiff, two physicians testified that in their opinions, based on hypothetical questions, Palmer died, not from carbon monoxide poisoning, cerebral hemorrhage or any other condition not covered by the policy, but from concussion of the brain. The two physicians who, when Palmer was found unconscious, attempted to revive him, testified, over objection, to the presence in the body of the deceased of the cherry red color characteristic of carbon monoxide poisoning. The jury disagreed, but the court granted the defendant-insurer's motion for judgment in its favor notwithstanding the disagreement, and the plaintiffs appealed.

Whether the evidence of the plaintiff's two medical witnesses that the insured died of concussion of the brain withstood the test of cross-examination and was sufficient to make a case for the jury, said the Supreme Court, depended largely on whether or not the evidence established that the body of the insured presented the cherry red appearance characteristic of carbon monoxide poisoning. The coroner's testimony as to the color of the body and the blood was not conclusive, for it was not shown that he qualified as an expert with respect to such matters. The two physicians who tried to resuscitate Palmer testified, over objection, to the presence of the characteristic cherry red color, but whether their testimony was admissible depends on whether information obtained by them in the course of their professional relations to the deceased was or was not privileged. The Minnesota statute provides in part: "A licensed physician or surgeon shall not, without the consent of his patient, be allowed to disclose any information or any opinion based thereon which he acquired in attending the patient in a professional capacity and which was necessary to enable him to act in that capacity." Mason's Minn. St. 1927, section 9814, subd. 4. Most reported decisions hold that information obtained by a physician in performing an autopsy is admissible even under statutes that forbid the disclosure of communications between a physician and his patient. The present case, however, is wholly unlike one in which a physician performs an autopsy, because then the physician is present, not to treat or minister to the patient, but only to determine the cause of death.

If the patient had been resuscitated, anything that the physicians learned in treating him would have been privileged. If the patient was alive when they commenced treatment but died during treatment, all would agree, the Supreme Court thought that the information obtained was privileged. How can it be different, then, said the court, in a case in which the attending physicians do not know whether the patient is or is not beyond hope of revival? To say that in such a case the admissibility of the evidence obtained by the physicians depends on the results of their treatment, rather than on the purpose of the physicians in administering treatment, would be absurd. Privilege, so far as it related to objective symptoms, the court thought, would be largely nullified, if the physician was compelled to tell what he saw the moment after death.

In the opinion of the Supreme Court, the testimony of the physicians who attended the insured when he was found unconscious was privileged and should not have been admitted. In the absense of the evidence of those physicians, the opinions of the physicians who testified on behalf of the plaintiff, said the court, justified the theory that the insured died from concussion of the brain, and the presumption followed, in the absence of proof to the contrary, that the violence that caused the fatal concussion was the result of accidental means.

The judgment was, therefore, reversed.—*Palmer v. Order of United Com. Travelers of America (Minn.), 245 N.W. 146.*—Abstr. *J.A.M.A.* (July 8, 1933).

Group Medical Service Plans

—Recent Developments on the Pacific Coast—

by

ROY W. KELLY
Industrial Engineer

DURING recent months periodical payment plans for rendering both medical and hospital service have received marked attention by both the public and the medical profession along the Pacific Coast. California, in particular, has witnessed marked activity both on the part of county and state professional organizations and also on the part of firms and individuals offering special plans to employed groups and the general public.

The complexity of the subject is well illustrated by the unprecedented number of medical service plans and the volume of correspondence on this subject which have been referred to the Committee on Public Relations of the California Medical Association. For several years this Committee has been actively studying these problems and endeavoring to formulate guiding principles for constructive action which would be acceptable to the medical profession. After much discussion in county and state meetings, substantial agreement has now been reached on governing regulations under which medical, surgical, and hospital service on the periodical payment basis may be offered by the various California counties.

In Oregon, Washington, and British Columbia legislative proposals, the development of private enterprises, and study of local or county plans have paralleled the activity in California. The entire field is developing so rapidly that only a bare outline of the more significant developments can be offered in an article of reasonable length.

Plans for Employed Groups

FOR THE PAST 15 years throughout the Pacific area much attention has been directed to offering medical care, first aid service, and hospitalization for employed groups, including industrial plants, retail establishments, and public service employees. More than a score of fairly large medical firms, some of them operating in several states, are selling service of this character. Prices range from $1 to $3 per month, depending upon age, nature of the occupation, and the amount of service given under the policy.

Lumber mills, mining camps, and railroads made substantial progress in this field during the world war and in the period immediately following. In some cases, this service was built up by the company itself, employing its own physicians, but the great bulk of this work is now being done by medical service companies or clinics, either under lay control or headed by one or more physicians. A few typical cases will illustrate the principles and methods used, and provide some data as to the cost to beneficiary members.

One of the leading oil companies operating in California has compiled figures for its medical plan covering six years ending December 31, 1932. Dues of $1 per month were paid by employees, who entered the plan on a voluntary basis and controlled the plan in large part through their own representatives. The company's contribution consisted principally in permitting employees to devote company time to the activities of the Sick Benefit and Welfare Association. Local physicians and hospitals were utilized to provide care, and the rates paid were comparable to existing compensation rates.

The limit of expense incurred for any one continuous illness was set at $300. Otherwise, reasonably complete medical, surgical, and hospital care was given, including general nursing, drugs, ambulance, and laboratory diagnosis. The plan excluded industrial accidents, venereal disease, dental work, hay fever, optical examinations, drug addicts and alcoholics, illegal acts, and any chronic condition or impairment existing at the time of joining the Association. The following summary indicates the financial result for the six-year period covered by the figures available. Members varied from 1,911 to 3,549.

Total income for six years at $1 per member	$204,369.15
Cash paid out for welfare loans (non-medical)	22,380.16
Net addition to surplus during six years	8,454.79

These figures mean that approximately 11% of the income was expended for non-medical purposes, and about 4% of the income was added to surplus during the six-year period. Stated in another way, the net cost of this plan for full medical and hospital care including nurses, laboratory, drugs and ambulance, was $.85 per member per month.

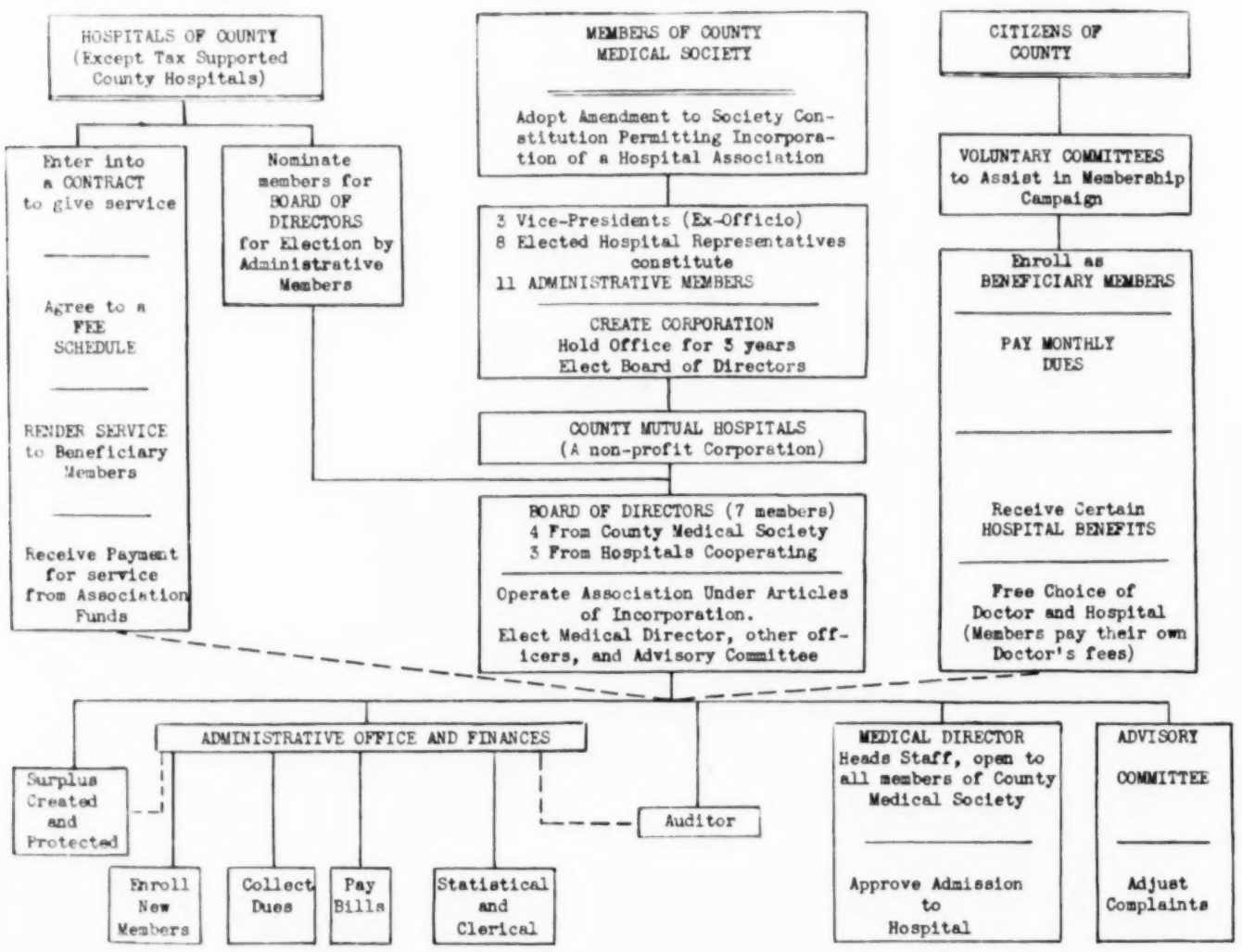
This organization consisted primarily of young men, most of them under 35 years of age. It did not include members of the family or dependents. New employees were hired only after receiving a thorough medical examination.

A group of companies, all more or less controlled by one corporation, conducted somewhat similar hospital plans during the last 10 years. These included a class-one steam railroad, an electric railway system in a metropolitan area, and two large oil companies. Having at times over 80,000 employees, they provided full medical care, hospital service, medicines, and general nursing during the period from 1920 to 1930 at about $1 per year per member. No service was given to families or dependents. Owing to accounting methods used by this group of companies, it is difficult to state exact results, but it is known that the medical funds were operated in such a way as to represent a financial result acceptable to the managements. It is true that some of the local doctors were not always well compensated, but the service given was satisfactory.

An Oregon company engaged in the manufacturing of textiles, principally knitted garments, installed complete medical and hospital service about six years ago. This firm employs about 600 persons of whom approximately 500 are women. A contract was written with a local medical service firm, under which 16 general practitioners and specialists were available. Hospitalization was rendered in the best of the local hospitals of the city in which the plant is located. The company provided a full-time nurse and certain clerical and administrative expense at the factory. Employees contributed at the start $1 per month, which was later increased to $1.25 per month. Fully satisfactory results to all concerned were realized.

In San Francisco and Los Angeles medical service firms offering opportunities of the kind described have been very active and a few of them have been successful in building up large memberships. Perhaps the most successful of these is a clinic in Los Angeles with a panel of 53 doctors and nearly 30,000 beneficiary members.

Two or three of these hospitals or health corporations are associated with insurance companies. Group rates are written on a so-called "actuarial" basis, under which account is taken of age, occupation, sex, length of service, and other variable factors. It appears, however, that most of the underwriting done by these companies is a thinly veiled excuse for meeting the group rates offered by competitors. This field is constantly being entered by new organizations, most of which seem to be actuated by profit motives rather than by a desire to solve serious economic problems or to render a public service.


HOSPITALS OF COUNTY (Except Tax Supported County Hospitals)
Enter into a CONTRACT to give service
Agree to a FEE SCHEDULE
RENDER SERVICE to Beneficiary Members
Receive Payment for service from Association Funds
Nominate members for BOARD OF DIRECTORS for Election by Administrative Members
MEMBERS OF COUNTY MEDICAL SOCIETY
Adopt Amendment to Society Constitution Permitting Incorporation of a Hospital Association
3 Vice-Presidents (Ex-Officio)
8 Elected Hospital Representatives constitute
11 ADMINISTRATIVE MEMBERS
CREATE CORPORATION
Hold Office for 3 years
Elect Board of Directors
COUNTY MUTUAL HOSPITALS (A non-profit Corporation)
BOARD OF DIRECTORS (7 members)
4 From County Medical Society
3 From Hospitals Cooperating
Operate Association Under Articles of Incorporation.
Elect Medical Director, other officers, and Advisory Committee
CITIZENS OF COUNTY
VOLUNTARY COMMITTEES to Assist in Membership Campaign
Enroll as BENEFICIARY MEMBERS
PAY MONTHLY DUES
Receive Certain HOSPITAL BENEFITS
Free Choice of Doctor and Hospital (Members pay their own Doctor's fees)
ADMINISTRATIVE OFFICE AND FINANCES
Surplus Created and Protected
Enroll New Members
Collect Dues
Pay Bills
Statistical and Clerical
Auditor
MEDICAL DIRECTOR Heads Staff, open to all members of County Medical Society
Approve Admission to Hospital
ADVISORY COMMITTEE
Adjust Complaints

Suggested Organization of a California County Mutual Hospital Association.

Legislative Proposals

ABOUT 15 years ago, following a state survey and a report to the legislature, the question of adopting a compulsory state plan for group

medical and hospital service was submitted to the voters of California. This proposal was rejected at that time.

During the 1933 session of the California legislature, an interim committee of the Senate was appointed to study the question of periodical-pay medical and hospital service for employed persons, and to make a report and propose a plan at the next session of the legislature. Although this committee was given no appropriation, it appears to have substantial backing, and no doubt a determined effort will be made to pass some legislation of this nature when the legislature convenes in January, 1935.

In British Columbia, a Royal Commission was appointed in April, 1929, to inquire into the subject of medical costs and benefits and to propose legislation providing for state health insurance. This Commission held numerous hearings and conducted extensive investigations over a period of nearly two years, expending approximately $25,000. It reviewed and published a digest on world laws, examined voluntary health plans of industrial medical organizations in existence in various countries, and collected and tabulated voluminous statistics covering conditions in British Columbia. The evidence collected in public hearings disclosed "an overwhelming desire on the part of the public, generally, for the introduction of both state health insurance and maternity benefits."

Published evidence indicated that a large proportion of the population of British Columbia was unable to pay its normal sickness expense and was being deprived of adequate medical service. Preventive measures and anticipatory diagnosis were found to be largely neglected. The report claims that diseases are aggravated and health is commonly impaired because people stay away from doctors and hospitals until the acute stages are reached.

Eleven British Columbia hospitals submitted figures showing uncollectable debts, ranging from 25% to 50% of annual earnings. In 1930 fees received from patients for 66 hospitals totaled 52% less than the operating cost. State and municipal grants to these hospitals for that year totaled $1,415,760.

Plans proposed by the Royal Commission were based on extensive morbidity tables, hospital costs, and figures covering operation of the workmen's compensation act. The report contends that a scheme of compulsory health insurance could operate with a reduction in the amounts now paid by the state and employers for health and accident service. Legislation proposed by the commission provided medical and hospital benefits for both employees and dependents. Contributions were to be made as follows: two-ninths of the total cost by the Province; two-ninths by employers; five-ninths by employees. Costs were estimated at $2.72 per month per employee, which included care for an average of 2.4 dependents per employee.

Although this legislation seemed to meet with considerable favor at the start, the bill was finally killed, owing to an insistent public demand for reduction in taxes and the fear that the commission's figures were misleading as to the eventual burden to be placed on the taxpayers.

With the growth of public interest and collective action brought about by the National Industrial Recovery Act and other recovery legislation, there is certain to be interest in this field.

We can expect fresh efforts to be made along this line at each session of the various legislatures on the Pacific Coast.

Tax Supported Service

IN CALIFORNIA approximately 50% of all hospital beds are now tax supported. This state has a daily average exceeding 11,000 persons in hospitals, whose bills are paid by public taxation at a cost exceeding $15,000,000 annually. Thousands throughout the state who could well afford to pay a small monthly sum, now pay nothing for any form of medical or hospital service. Two-thirds of all the hospital beds in the United States are now supported by Federal, state, or local taxes. In addition many millions are expended annually in taxes for public health activities, health work in public schools, medical care for veterans, and for other similar purposes. Large private donations are also made through Community Chests and other charitable channels for the payment of medical bills. San Francisco and Los Angeles together spent in excess of $1,000,000 during 1932 through Community Chest supported agencies for such purposes.

Plans Adopted in California

THE COMMITTEE on Public relations of the California Medical Association after several years' study of the problem proposed a set of principles to govern the establishment of medical service plans of counties. These principles were adopted by the Association Council in September, 1932, and have subsequently been fully discussed and ratified by state meetings of the Association, which is representative of more than

5000 practitioners. The principles adopted are as follows:

1. The plan shall include an insurance principle whereby the beneficiary pays at periodical intervals specified sums for defraying the expense of future illness.

2. Medical or hospital service shall be considered separately from indemnity disability.

3. The sole control of any organization for medical and surgical advice must be limited to members of the medical profession.

4. Compensation for professional service, medical or surgical, shall be on a unit basis.

5. Professional service shall be limited to the members of a component county medical society or groups thereof endorsed by the official organization and by a two-thirds majority of all members. No plan shall be adopted or put into effect except with the approval and under the direction of the Department of Public Relations of the California Medical Association.

6. The beneficiary member shall have the right of selection of any physician or surgeon from the entire membership of the county society, or group thereof, that participates in the plan.

7. No member rendering service under the plan shall be entitled to compensation for any service rendered to a beneficiary member unless rendered by him personally and without the intervention of any doctor of medicine, unless the services of more than one doctor are necessary.

Under these principles organization activity has proceeded in several counties. In most cases attention has centered upon developing a plan which would provide hospital service only, at the start, medical care to be added when justified by popular demand and when the surplus in the treasury; becomes adequate to provide financial security.

Alameda County and Fresno County have been particularly active. In these counties, a corporation is being formed with a board of directors representing both the hospitals and members of the County Medical Society.

Hospital service to beneficiary members will be rendered at a basic rate of about $1 per month, with the possibility of a somewhat lower rate for employed groups and children. The accompanying chart indicates the more important elements entering into these county plans.

Enrolling Beneficiary Members

THE EXPERIENCE of private hospitals and medical service firms in this field should teach certain important lessons with regard to the number of beneficiary members required to establish a county plan and the best method to be assured in enrolling them. Even in a small county, less than 10,000 members in any group plan are likely to prove a liability instead of an asset.

Without the spread of risk given by substantial numbers, the plan is apt to be wrecked by a few serious illnesses or by an epidemic. Restrictions on the plan which would fully protect it with only a small membership make it unacceptable to the public and render the plan futile in its effects upon public health and economic conditions. Furthermore, a small number of members involves an unavoidable fixed administrative expense which is entirely too high a percentage of the income.

Selling memberships through paid salesmen along the lines established by life and casualty insurance companies is not likely to prove an acceptable procedure. Selling by such methods is certain to involve an expense of 30% to 50% of the annual income.

This either leaves too little for the doctor and hospitals, or else it increases the monthly rate to a prohibitive amount.

The concensus of opinion appears to be that a successful campaign for membership should be conducted as a community enterprise, in much the same way that a community chest campaign is managed. By utilizing voluntary committees representing employers and employees, public service groups, social workers, educational institutions, and other interested groups, the work of securing an adequate initial membership can be done at low cost and with far higher degree of public support and confidence.

The campaign should be conducted on a basis of employing a professional director who should receive a flat salary. He should prepare an itemized budget for his campaign expense which should be paid on approval of itemized bills by the board of directors. Any economies practiced would result in a direct saving to the Association. Any percentage or commission basis, or an allowance of so much per membership when secured, is an unethical campaign method and has long since been abandoned by all the larger Community Chests and other similar outstanding community enterprises.

A well-conducted campaign would use an immense amount of free publicity and voluntary committee service which would never be available if the campaign were regarded as a profit-making venture.

The King County Medical Service Bureau

DURING THE SUMMER of 1933 a plan was launched in Seattle, Washington, covering King County, in which this city is located. The King County Medical Service Bureau was formed with the cooperation of the county medical society and under its auspices. Six physicians were chosen as directors, and they incorporated the Bureau as a non-profit organization. To finance the plan at the start, about 200 doctors subscribed to the plan and each contributed $10 to its treasury.

Since its incorporation, about 130 additional members of the county society have joined the Bureau. Thus the present membership of 330 physicians represents a substantial majority of the total 500 members in the county medical society, and includes practically all of the younger men under 50 years of age.

A layman has been employed as business manager, and a corps of solicitors has been used to enroll industrial and other employed groups. Service is offered to persons in the income group of $150 per month or less, with special permission to take in certain members up to $200 per month income. Large groups are offered a fairly complete medical and hospital service at $1.25 per person per month, while smaller groups pay $1.50 per member per month. This rate was set, not on account of any special statistical evidence or underwriting, but to meet the competition of other local plans which were offering service at $1 per month.

There are certain specified exceptions, and chronic diseases or impairments existing at the time of enrollment are treated according to a schedule of rates definitely agreed upon by the physicians. It is claimed that aproximately 6,000 beneficiary members had been enrolled by the middle of October, 1933.

Just a Better Way to Collect Medical Bills

APPARENTLY a large majority of the medical profession in the western states are favorable to some plan which will eliminate "unfair competition" on the business side of medicine, reduce the waste of duplicated facilities and idle time, and avoid the danger of state controlled medical practice. The majority is still determinedly opposed to adopting any plan which they think will tend to disturb the relationships between the doctor and his patient.

Chester Rowell, editor of the *San Francisco Chronicle* and one of the most astute columnists in America, thus expresses the conflict of ideas on this subject, after pointing out that it is a question not of how to treat patients, but how to send and collect bills:

"Under any system, the physician . . . will have his own patients, who select him because they want him, and his individual professional (not business) relations to them will be just as they are now. This is the profession of medicine, and nobody proposes to change it.

"But on the business of medicine one school insists that the doctor's office nurse shall continue to send his bills, for each service, to the patient and to collect them herself, while the other school proposes that the patient shall pay regularly into a group or insurance fund, and that the doctor shall be paid from that fund. One school clings to 'individualism,' while the other proposes organization, in the business (not the profession) of medicine.

"Which business method is the best business way of doing the business of medicine may well be debated, on business principles. But the first step toward intelligent discussion is to recognize that it is the business of medicine which is involved. Neither the science nor the professional part of the practice of medicine is affected."

Plaster Cast for Fractured Clavicle

By A. H. HAUBER, M.D.
Chicago

IT IS my intention to describe as briefly as possible a method of using plaster casts for fractured clavicles.

The object of using some form of retention for a fractured clavicle is to bring the fractured ends into apposition and hold them there so that union will take place and pain be diminished;

Illustration semi-diagramatic showing plaster cast in position over clavicles and style of bandaging.

also to prevent healing with much shortening which would cause noticeable disability of function. Likewise malunion may leave an unpleasant deformity, especially for women and girls.

It has been my experience that the various de-

vices commonly used, which depend on some form of retention which forces the shoulders backward and are held by straps under the arms, do not work out as well in practice as appears in theory.

My method of plaster cast has not the objectionable features of T splints, etc., which I will

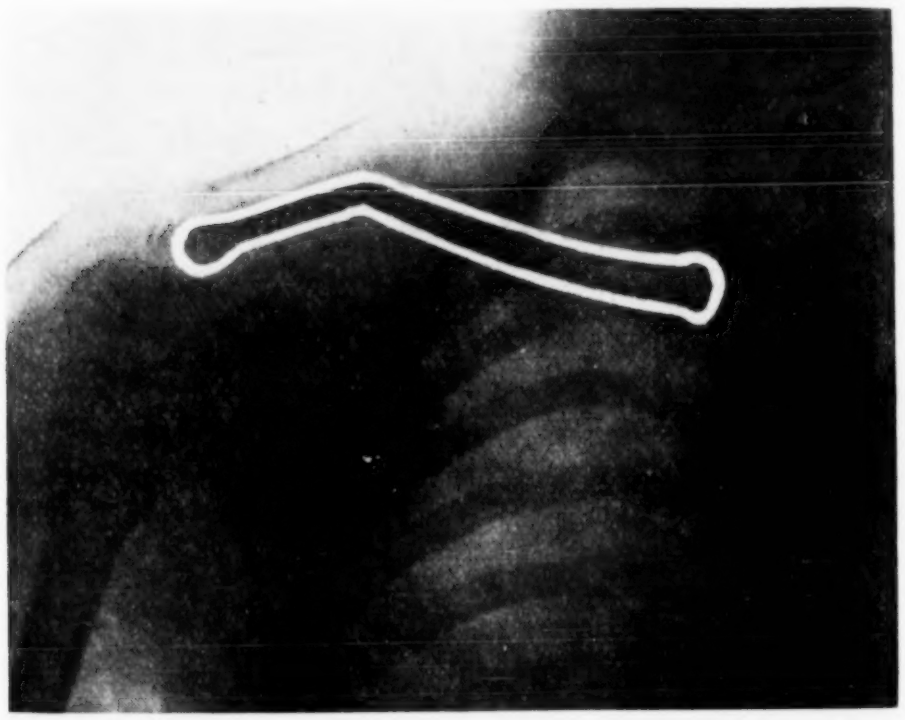


Fig. 1-A. Shows green-stick fracture of clavicle in child. This type of fractured clavicle is almost impossible to keep reduced with a mechanical appliance.

enumerate later, and also has practical advantages.

It is used as follows: the patient lies on a table with a small sandbag between the shoulder blades. With a piece of adhesive tape, measure across chest from the middle of the head of the left

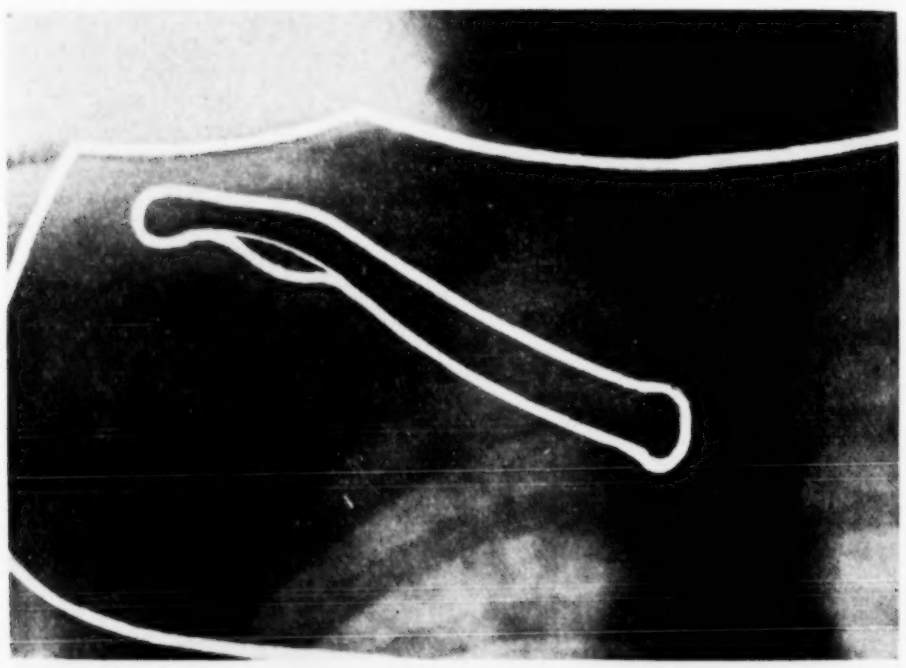


Fig. 1-B. One month after application of plaster molded splint. Union complete and no deformity. Outline shows callous formation.

humerous to the same point on the right humerus head. This piece of adhesive tape is stuck on a table for size. Next a molded splint is made with from two to four rolls of 3″ or 4″ plaster roll, depending on the size or muscularity of the individual. This is laid on the patient's chest so it reaches from the Pomum Adami downward to mid-sternal region. This width can be estimated when making the molded splint. Use hot water in making molded splint. The molded splint is pressed firmly down over chest and shoulders so it forms a perfect mold of the part. With a heavy curved scissors cut out a yoke at the neck

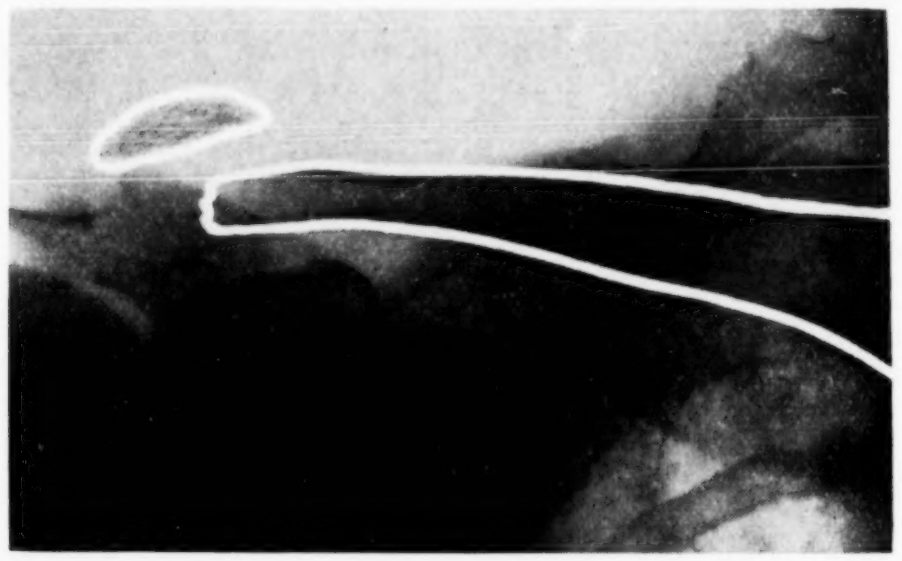


Fig. 2-A. Fractured clavicle in adult man with acromial end of clavicle detached. This type also is well nigh impossible to approximate broken detached parts of bone with mechanical splint.

and pat down over clavicles. This is done before perfectly dry. Let splint dry, then put a thin layer of cotton under it and bandage to chest with figure eight type bandaging. I prefer no adhesive tape on skin even though the bandage can be reinforced with adhesive.

The unaffected side can have a little of the splint cut away if desired, to permit more motion and the arm should be carried in a sling. It

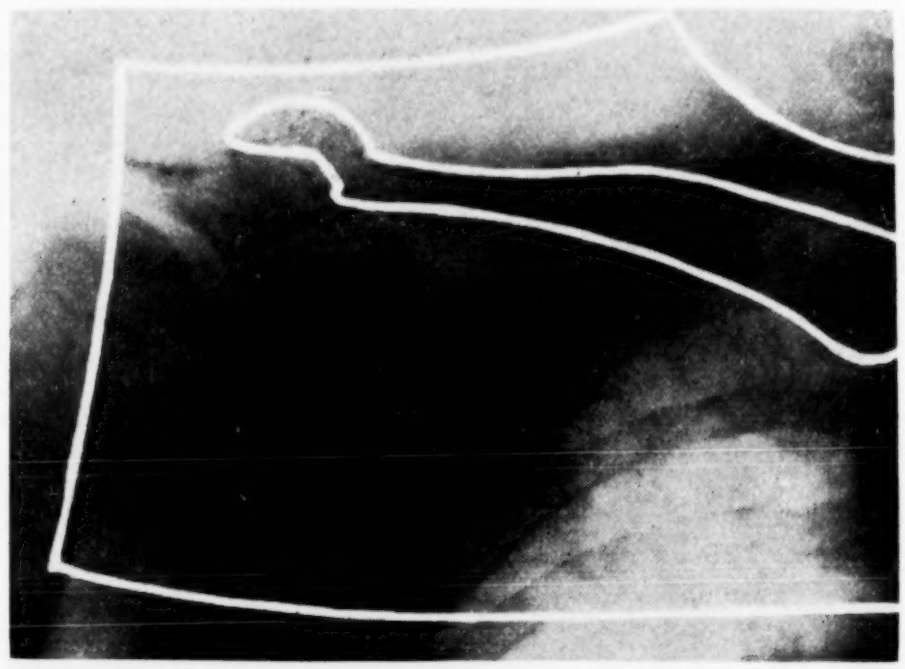


Fig. 2-B. Roentgenogram three weeks after application of plaster mold showing detached part of bone in opposition with parent bone and callous forming.

is well to remove plaster splint every four or five days, sponge the patient with soap and water, follow by an alcohol rub and reapply the splint. One month finds enough union to discard splint. However, two more weeks of easy motion of the arm is essential.

The following advantages are claimed:

1. It is very comfortable for the patient.
2. Pressure is applied uniformly and evenly against the shoulders and over the clavicles.
3. The weight of the cast while not noticeable to the patient brings the fractured parts together.
4. Stays in place if applied properly and does not need frequent adjustment.
5. Nothing on the patient's back to prevent comfortable sleep.
6. All the above advantages are absent in mechanical supports and constitute disadvantages for them.

Accidents and Carbon Monoxide *

By Max Trumper, Ph.D.,
Consulting Industrial Toxicologist,
Philadelphia, Pa.

CARBON MONOXIDE, one of the industrial hazards not obvious to the eye, is not only the leading chronically poisonous gas in industry and in the home, but also there are "more deaths from the inhalation of carbon monoxide than from all the other noxious gases."

One of the reasons why carbon monoxide is such a serious poison is that when it is present either in small or large amounts, no odor is apparent except in the case when this poisonous gas is mixed with other gases, as in the escape of manufactured gas. The great majority of the instances of carbon monoxide poisoning in industry come from the incomplete combustion products in which carbon monoxide predominates. Here the presence of carbon monoxide cannot be detected except by chemical analysis of the air or of the patient's blood. As a rule its presence is only obtained or noted when the workers begin to show symptoms of poisoning.

Carbon monoxide if present only to the extent of 0.2% and when breathed continuously will cause death. The reason why such small amounts of this poison can so seriously affect the worker is because carbon monoxide has 300 times the affinity that the oxygen of the air has for the hemoglobin or red coloring matter of the blood. This small amount of carbon monoxide in the air is in itself not harmless, but unfortunately these small amounts not only are absorbed but also are cumulative in a direct ratio to the activity of the worker and his breathing efficiency. Carbon monoxide is doubly toxic to man. First it reduces the oxygen carrying capacity of the blood just as effectively as if that part of the blood which has combined with carbon monoxide has been lost through hemorrhage. Secondly, it restricts oxygen from leaving the blood to go to the tissues where it would be consumed. This deficiency of oxygen or anoxemia is a partial asphyxiation in mild chronic cases which is compensated by an increase in red cells and hemoglobin of the blood known as a relative polycythemia. In other words the man who is working strenuously will absorb five to 10 times more of this poison than will a fellow worker similarly exposed but who is just loafing or at rest. Since this poison cumulates in the blood, we find that late in the afternoon is the period of the day when the maximum concentration of this poison and its asphyxiation effects are reached. The content of the blood of steel workers has been found to average three to four times as much carbon monoxide in the late afternoon as in the morning. It is also late in the afternoon when the peak of traumatic accidents occurs, because of the increased tendency to fatigue at that time of the day. Thus we see the combined vicious effect of chronic carbon monoxide poisoning, which in itself predisposes to fatigue, plus the normal tendency to fatigue in the late afternoon. For these reasons it is my contention that the chronic exposure to carbon monoxide predisposes the skilled worker to fatigue, and this superimposed upon the natural tendency to fatigue in the late afternoon is a fundamental reason why the peak of industrial accidents is reached in the late afternoon.

In chronic carbon monoxide poisoning the worker's ability to concentrate his attentions is definitely reduced while his judgment and poise are likewise affected. This is but another way of saying that the worker's mental coordination and control is poorer. These mental handicaps of mild carbon monoxide poisoning, because of the gradual and insidious nature of their developments, are not nearly so well known as the more apparent physical symptoms of this chronic poison, namely, those of quick fatigue, poor muscle coordination and general inefficiency.

While we are more apt to know of the seriousness and wide distribution of acute carbon monoxide poisoning, insufficient attention has been devoted to the mild or chronic cases. In my opinion it is these very mild cases that industry is paying dearly for, especially in those states that do not have occupational disease compensation. This sounds like a paradoxical statement, but it is a fact that those states which have occupation-

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* Read at the Pennsylvania Annual Safety Conference, Harrisburg, Pa.

al disease compensation are the very ones where the employees have been trained and educated to recognize the early symptoms of carbon monoxide poisoning, whereas in those states in which compensation is not available for occupational disease those workers exposed to small or large quantities of carbon monoxide receive little or no attention until an accident occurs. The average worker is reluctant to complain of a simple headache, or the lack of appetite, or of a tendency to nausea. Yet it is these minor symptoms which are warnings of the presence of mild carbon monoxide poisoning. We know that the worker regularly exposed to small amounts of carbon monoxide develops headaches, the severity of which of course increases with the amount and the extent of carbon monoxide absorbed.

Thus many of the traumatic accidents in industry are the result primarily of the accumulative effects of inhaling small quantities of carbon monoxide not sufficient to produce acute symptoms which are so easily recognized but sufficient to hasten fatigue, to reduce both mental as well as physical coordination and activity, and to predispose the individual to the loss of the finer and skilled coordination. The loss of muscle power is evidenced by the worker becoming clumsy, tendency to stumble; in fact if the poisoning becomes more severe, in many of these non-fatal cases of carbon monoxide poisoning the individual acts like a drunken man. Thus in many of these cases which are not recognized as mild carbon monoxide poisoning, industry foots the bill for the increase in traumatic accidents in industry. Unfortunately when the worker recovers he's just as liable to have the same accident occur unless the cause of the carbon monoxide poisoning has been removed or reduced. Thus it seems to me that here the employer as well as the employee have much to gain by interesting themselves in the preventive aspects of occupational disease.

Latent Syphilis Activated By Burn

IN THE COURSE of his employment, Harder was burned in the arm with molten lead. Ten days later his mental condition appeared abnormal and the disturbance was first diagnosed as melancholy. The burn had healed sufficiently well in five weeks for him to be discharged as cured. His mental condition, however, gradually grew worse and some three months later it was diagnosed as general paralysis of the insane, attributed to syphilis. Death ensued and his widow was awarded compensation by the industrial commission, which held that the industrial accident activated a pre-existing syphilitic condition, which in turn was the cause of the death. The employer and his insurance company eventually appealed to the St. Louis (Mo.) court of appeals.

The appellants complained of the action of the industrial commission in permitting a chiropractor to testify that a burn can affect the superficial nerves, resulting in an irritation of the nervous tract; and that it was very much of a possibility that the burn had produced his insanity. The testimony of the chiropractor, said the court of appeals, was competent. It went only to matters falling within the preview of the subjects of which the chiropractic practice act requires a chiropractor to be informed. Moreover, the appellants were in no position to object at this time to that testimony. It came in wholly without objection and part of it was elicited by the appellants' own counsel on cross-examining the chiropractor.

The appellants next denied liability for compensation where an industrial accident has aggravated or precipitated a preexisting condition without which the ultimate effect of the injury would have been slight or trivial. Bearing in mind, said the court, the humanitarian purpose of the workmen's compensation act and the liberal construction to be given its provisions, compensation under such circumstances should be granted. In the enactment of the Missouri compensation act the legislature saw fit to prescribe no standard of physical fitness to which an employee must conform. His right to compensation does not have its basis in any implied warranty of perfect health or freedom from latent and dormant tendencies to disease which may develop into positive and known conditions if incited and stimulated to activity by any accidental cause arising out of and in the course of his employment. The act is designed to afford protection to the weak as well as to the strong employees. In the practical application of the act, the disability or death for which compensation is to be given may just as legitimately be attributed to the accidental injury where undeveloped and latent physical conditions are set in motion and accelerated so to produce such final result, as where the same result follows directly from visible violence done to the physical structure of the body. The award was therefore affirmed.—*(Harder v. Thrift Const. Co. (Mo.), 53 S. W. (2d) 34).*

Two-Shift Employment of Women

—A Discussion of Certain Hygienic and Morat Questions Where the Two Shifts Do Not Cover Midnight to Morning—

by

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The Wiley-Smith Clinic
Fond du Lac, Wis.

THE LAWS of the country give the right to vote equally to men and women, and custom apparently has accorded them the privilege to smoke and drink on the basis of equality. The hypothesis is accepted that women have an equal right with men to employment in industry under contract. It follows, then, that legislation should influence this exercise of privilege only to the extent that it protects women from being coerced to enter contracts injurious to themselves or to others.

The sex differences between men and women have been overemphasized as to their importance in industry, and on the basis of this overemphasis women have been prevented from doing certain kinds of work which they have desired to perform. On the farm this sex difference applies only in so far as the individual is concerned, and the woman herself decides what she should do and what she should not do. We are not aware that the health of farm women has been jeopardized by this exercise of their own judgment and inclination.

The differences between men and women in regard to physical activity are less emphasized among those races that have not reached the stage of so-called civilization to which we have attained. In most instances the women are able to do practically the same work that the men do and about the same amount of it. This does not apply to the heavier forms of toil for the performance of which only the heavier and stronger built men are adapted. But in the lighter types of activity more suitable to the physique of women, it is common observation that the quality as well as the quantity is not materially less in the case of women. These statements do not apply, of course, to those individuals of any race who have been reared in luxury and relative inactivity. Serious consideration is to be given to the great middle class in which lies the strength of any nation, and it is proposed to judge the needs of the whole by what most vitally affects this class. If these working women the world over could be protected by custom or regulation during the reproductive periods, they would undoubtedly share with the men an equal degree of health during advanced age. Even under existing conditions, characterized by disregard or ignorance of such precautions, it has been found that the number of centenarians among women in some foreign lands considerably exceeds the number among men.

The principle is accepted that work which women are permitted to do should not be such as to interfere with the reproductive functions, for by so doing the next generation is made to suffer. The present generation must be protected for the sake of the one to come, if not by the exercise of common sense then by legal regulation. Just so long as women are protected from avaricious employers, and their prospective offspring are not made to suffer because of economic pressure and physical strain, then further legislative regulation of their employment would seem to be discriminatory and unjust.

One form of physiologic difference between the sexes is indicated by the "metabolic rate." This represents the speed at which the chemical and other processes of the body proceed. This is definitely higher in men than in women, and in the determination of the "basal metabolic rate" a correction is made for the sex factor. With a recognized difference of some 15% in this rate, it is not surprising that there should exist some types of physical activity to which men are better adapted and some which can be performed with greater ease and less fatigue by women. Just which these are could be determined with nicety by careful study, but the general reaction of employee and employer to a given form of work indicates roughly those which demand special investigation.

The substitution during the war of women for men in industry demonstrated the greater efficiency of the former in many lines of work. The continued employment of women in some of those capacities has been the result of her greater efficiency in the performance of given tasks, rather than the fact that they might have been induced to accept smaller wages. In general those processes requiring deftness and delicacy, patience or constant repetition are better performed by women than by men. In many

industries, therefore, the employment of women rather than men is a matter of efficiency and not finance. If then a woman can do a certain type of work with greater efficiency and less fatigue than a man, it seems reasonable to allow her to do it.

In the literature on the subject one encounters occasionally an article purporting to show the increased incidence of female disease or of infant mortality as a result of the employment of women in factories. If these conditions are true, and if we admit that women have a right to be gainfully employed, then it behooves us to learn by careful study just what factors go to increase this morbidity and to eliminate them if possible. This has more to do with the individual type of occupation than with the broader question of women in industry. It is hardly to be expected that the average health of women employed in factories would be as high as the health of those voluntarily unemployed and provided with adequate financial support to enable them to indulge continuously in recreation and sport. Comparison of these two classes would lead to very erroneous conclusions. If it can be shown that any type of occupation is injurious to man or woman, it should either be made safe for the worker or eliminated. No human being should be forced by circumstances to jeopardize his health or life in the employment of another.

Much has been written concerning women in industry especially as to the hours and conditions of labor. Most of this is polemic in character and displays a tendency to fuzzy-mindedness. The mental bias is often very evident and the ulterior motive is usually apparent. Night work, as such, has been discussed in various articles, but little that pertains to evening work, in contradistinction, was to be found. The available and pertinent evidence was derived mainly from extraneous sources.

Strenuous objection has been raised against the employment of women on the night shift, and practically all the objections raised might with equal propriety be registered against the use of men for that same period. It is perhaps unfortunate that the stage of civilization which we have reached demands that a certain amount of night work be done. We, as a nation, have accepted night work as inevitable and then have sought to exclude women from any share of it. Whether this form of discrimination is right or wrong is outside the province of this discussion, yet the point should be emphasized that *evening work* and *night work* are by no means the same.

One of the essential features of working two daily shifts is the employment of at least part of the women during the evening hours. A compensation for this encroachment upon the time ordinarily devoted to amusement is the fact that other parts of the day, during the sunshine hours, could be devoted to recreation. Those forms of amusement and relaxation which are carried on during the daytime are much more likely to be conducive to health than those enjoyed during the evening. This is especially true in regard to the eyes, lungs, and muscles which are the most likely to suffer from improper employment and environment.

A review of the literature on "night work" for women reveals certain arguments which have been advanced in opposition to it; but they appear as more or less valid objections to night work for anybody, man or woman. These often reiterated arguments have been resurveyed with reference to their applicability to "evening work," and the appropriate comments are presented herewith.

The Reversal of Natural Functions

THE HOUR of 10:00 P.M. is the average retiring time of a large proportion of the adult healthy population of the United States, both male and female. It is unusual for adults to retire before this time but very common for individuals of both sexes to retire much later. These times are not related in any way to the nature of hours of their employment. From seven to nine hours rest is perhaps the average, and in case of a later retirement the hour of arising may be correspondingly altered. Therefore, employment until 10:00 P.M. or even later is not in any sense a reversal of natural functions; these functions follow the usual course whether the woman is gainfully employed from 6:00 P.M. until 10:00 P.M. or whether she spends the time in recreation or other forms of activity.

The fact that so many people do not work at all after supper is beside the question, for by so doing they voluntarily make the period following supper different from that which follows breakfast and lunch. These meals in the ordinary course of events are followed by a few hours of physical activity, whereas most people do not fill their evenings with work. Many also eat more heartily in the evening than they do at any other meal of the day, and sleep poorly because of this custom. Sleep undertaken when the stomach is overloaded is often broken and

disturbed. Sleep is more frequently deep and uninterrupted when the stomach is more nearly empty, and there is little or no gas or fluid to press on the heart. Inactivity, in the physical sense, is conducive to a sluggish digestion, whereas moderate physical exertion stimulates digestion and tends to clear the stomach at an earlier period. This is not a reversal of natural functions but an enhancement of them. Apparently evening employment is conducive to physical health rather than an impairment of it.

The evening hours until 10:00 P.M. or later are often chosen by vigorous adults of both sexes for gymnastic exercises, bowling, basketball, indoor baseball, dancing, etc., and both pleasure and physical profit are derived therefrom. They do not consider that they have reversed the natural functions in so doing.

The normal rhythm of metabolic activity of the body is a well recognized fact. The highest point in the daily curve of temperature and blood pressure is late in the afternoon. This high level persists with little diminution until well into the evening, after which it slowly declines to find its minimum between 3:00 A.M. and 4:00 A.M. Physical activity is most efficiently and physiologically carried on at the time of greatest metabolic activity, and the performance of the former does not pervert or alter the latter.

It should be understood that the term, "night work," in this discussion refers to the period from 12:00 midnight until 5:00 A.M. In these comments "evening work" is meant in contradistinction.

Loss of Sleep

FOR THOSE whose natural and chosen retiring time is 11:00 o'clock or later, there would be no loss of sleep whatsoever. This naturally assumes that the work has not been so strenuous as to render the worker too tired to sleep. An eight- or nine-hour day with reasonable work should not render an individual, man or woman, too tired to sleep. If it should do so there is need for an examination of that individual's health or the nature of his or her employment.

For those whose retiring time is earlier than perhaps 11:00 o'clock, a slight corresponding adjustment in the time of arising can be made without difficulty in most families.

If there is no loss of sleep then the evils attending loss of sleep can be dismissed from further consideration. Sleep is necessary, and that which detracts from its quality and quantity does injury to the individual. However that is a relative matter. Some individuals can readily adjust themselves to almost any change in sleep hours or accommodations; while some are unable to sleep satisfactorily under the most conducive circumstances. If sleep is satisfactory and not interferred with by the employment, then the matter of fatigue is also automatically eliminated from consideration.

The mental attitude is also important, for the regularity of work or even the monotonous nature of it is much more conducive to sleep than the "post mortem" recollection of a card game, a new thrill from a road house, or a stimulating picture at the movie. Surely in comparison the worker has the physiologic advantage.

Deprivation of Sunlight

THE *present single-shift schedule* of hours varies of necessity in the different factories, and for inherent reasons that cannot be considered here. The hour for commencing work is between 7:00 and 8:00 for most factories. This would require that the worker arise sometime between 6:00 and 7:00 A.M. and would enable her to go to work after sunrise for perhaps two-thirds of the year. The sun arises in this altitude at 7:41 A.M. on Dec. 22, which is the shortest day of the year, and at 4:22 A.M. on June 22, which is the longest day. It is rather unlikely that a woman would arise earlier than necessary just to enjoy the additional sunlight that would be available. The amount of early morning sunshine is, therefore, of no consequence to the average worker, no matter what time she begins work.

In the afternoon the sun sets at 4:31 P.M. on December 22, and at 7:41 on June 22, and at intermediate times between these dates. There is, therefore, for some workers, sunshine left when the hour for quitting work comes, and for others there would be a trip home in semi-darkness. Those whose daily hours are longer would probably have Saturday afternoon off, and they could in this way make up for lack of sunshine during the week. During the noon hours there would be some opportunity to become exposed to the sun's rays. Perhaps two hours of available useful sunlight per day would be the average for the majority of workers in factories under the present system.

Under the proposed double shift, the *first shift* would begin at 6:00 A.M. or perhaps a little earlier. For those who arose at 5:00 A.M. there

would be a walk in the sunlight during approximated half the year. The lunch period would be a variable arrangement, and this would affect the closing hour. From approximately 2:00 P.M. on the worker would be able to enjoy the sunshine until sunset; the exact amount of available sunlight varying with the time of the year. This, including the lunch period, would average about four hours per day. Furthermore this period occurs at the time of day when the value of the sunlight in terms of ultra-violet rays is great. The worker on the *second shift* has had all the morning and up until 2:00 P.M. to enjoy and make practical use of the sunshine, really from seven to eight hours of it each day, and she is five to six hours ahead of the regular worker in the matter of possible exposure to ultra-violet rays from natural sources.

In the matter of sunshine, therefore, the women affected by the proposed change would be from two to five or six hours ahead of those who follow the present single-shift schedule.

If there is an actual increase in sunlight available all arguments as to deprivation of sunlight are automatically dismissed.

Injury to Sight

THIS ARGUMENT narrows itself down to a question of the relative value of natural day light as compared with artificial light. In former times this was probably more important than it is now. The question even today is not a simple one, for the quality of light provided is the variable and most important factor. Where sunlight is depended upon, the illumination of each and every machine cannot be uniform, as they are not equally distant from the windows. Therefore, some workers will have adequate illumination, while other will suffer from insufficient light. Individual lighting of the bench or machine partly solves this problem.

Apparently it is tacitly assumed that natural illumination is superior to artificial light. This is not always the case, for there is an ever growing tendency in the new factories to depend almost, if not entirely, upon artificial lighting. This has been so improved that the shift in this direction is justifiable. The light in a factory—be it diffused sunlight, direct sunlight through ordinary glass windows, or artificial light—is negligible as a means by which to replace sunlight as a source of ultra-violet rays.

The only reason for considering illumination is the effect on the eyesight. It is doubtful if the artifiical light of the present factory is more injurious than that which may be admitted through the windows. Hence it is of little or no importance just how much the given worker has to depend upon artificial light, and how much natural illumination there may be available for her. It is also doubtful whether this artifiicial light is more conducive to fatigue than would be natural light. Nor is there any evidence that I can find that would indicate that artificial light is more injurious to the nervous system than is the natural illumination. If the question of "eye strain" is considered, it is more likely due to the nature of the work done rather than to the hours in which it is done or the source of the illumination which makes it possible. Certain it is that the intensity of artificial light is not so far below that of diffused daylight as to make dim light a source of eye strain or nervousness.

Fatigue

FATIGUE is the ultimate result of maladjustment of an individual to his surroundings, his work, or both. It has many etiologic factors, but consideration can be given only to those of extrinsic origin. Normal activity under optimum conditions can produce fatigue only when prolonged beyond physiologic limits. Fatigue may result in shorter time in proportion to the difficulties under which the activities are conducted. The effect of the loss of sleep has already been mentioned.

Fatigue reduces the efficiency of a worker, and lowers his resistance to infection. Excessive fatigue that goes over into the realm of pathology is not within the scope of this discussion, and its development is practically impossible on either of the two-shift schedules which exclude work between midnight and morning.

Disregard for a period of time of the various factors involved might have fatigue as a result, but it should not develop if these factors are absent. To establish fatigue as resulting in any industry or from any activity, it would be necessary to prove the existence of the causes of that fatigue. In this study the potent causes seem to be absent.

Higher Morbidity of Night Workers

IF THE CAUSES of illness are lessened by reason of more healthful employment, it is axiomatic that illness itself will be lessened proportionally. Thus far no cause of illness has been discovered that is inherent in the proposed schedule of hours of employment. If there ex-

ists any difference between single shift and double shift schedules of employment of equal hours and under like working conditions, the advantage rests with the workers on one of two daily shifts. The effect of the hours of employment in the two shift schedule is thus more conducive to life, health, safety, and the general welfare.

Accident Hazard

ACCIDENTS are due to carelessness or to improper adjustment of machinery, insufficient lighting, etc. Fatigue enters into the picture as a basis for inattention and carelessness. It is evident from a perusal of the foregoing presentation that the health of the individuals concerned would not be affected deleteriously by the change in the hours of employment. It is assumed that artificial lighting will be or is now so provided that illumination of the work is adequate and proper. Some artificial lighting is now in use, and more is likely to be installed. It would have to be shown that a moderate increase in the amount of artificial lighting during each of the two shifts would increase the danger of accidents before an objection could be sustained. There is also no reason to believe that a condition affecting women would be different from that which now affects men or even women who are employed at different hours. If it should be found that artifiical systems of lighting are responsible for accidents to women, it surely would be operative for men as well and, as such, would constitute a condition that in the interest of humanity at large should be remedied. However, it would be necessary to prove that this condition really exists before objecting on such a basis to the proposed two-shift schedule of employment.

Social and Moral Aspects

IT HAS BEEN shown many times that healthful and physical as well as social conditions make for a high moral standard in a community, and that the reverse is often too true. It seems that the time and conditions attending this form of employment are all important in deciding this matter. The social aspects are not the same for every woman regardless of her domestic circumstances, hence it seems best to consider the various classes of women with respect to this factor.

First Shift, 5:00 or 6:00 A.M. to 2:00 P.M.

(A) UNMARRIED WOMEN WITHOUT HOME RESPONSIBILITIES: The only social or domestic inconvenience that is likely to occur is the early rising of one member of the family when the remainder desire to sleep later. This demands that the individual cook her own breakfast or else that someone get up and prepare it for her. In either case there might be a little disregard of the proper dietetic requirements of the individual. This is a matter for which the woman herself rather than any industrial system or social scheme should be held responsible. No one can be held accountable for the willful carelessness of another. There seems to be no moral issue in this case.

(B) MARRIED WOMEN, OR THOSE WITH DOMESTIC DUTIES: Early rising with preparation of her own meal before the remainder of the family choose to get up may seem like a hardship unless this duty is borne vicariously by other members of the family. If there are children to be sent to school, it would be necessary to depend upon others for this service. However, the same conditions exist when the working hours begin at 7:00 A.M. and the school hour is 9:00 A.M. This has not been found an insurmountable difficulty. The children might not be so well cared for in the morning before school hours and during the noon recess as would be the case if mother were at home. This is not an ideal arrangement in any case, but economic conditions may have been determinative. A decision by the family would be required, and, if the details could not be arranged, a change from one form of employment to another might be found necessary. This is an individual matter and not one that can be controlled by legislation or regulation. The so-called "double burden" of industrial employment and home responsibility does not enter to any great extent. There is ample time after school hours and during the evening to do for the children almost everything required of a mother.

Second Shift, 2:00 P.M. to 10:00 P.M. or Later

(A) UNMARRIED WOMEN WITHOUT HOME RESPONSIBILITIES: About the only inconvenience caused by these hours of employment is that the evening must be spent in gainful occupation instead of social intercourse. Judging from the way many women spend their time, this would be helpful rather than the reverse.

One is often impressed by the social whirl in which many of these girls live. Their extra-industrial activities constitute a definite drain upon their vitality, and doubtless form the basis for much of the morbidity commonly ascribed to the "employment of women in industry." Excessive and often improper nocturnal activities and pleasures, coupled with insufficient sleep, form a good background for fatigue, industrial

accidents, and eventual breakdown in health. Indulgence in this form of life is voluntary on the part of the woman worker, in spite of the danger to which she doubtless knows she is exposing herself. That which prevents her from taking part in such activities is operating in her behalf.

If there is any moral slant to this issue, it would be in the positive direction. Those who are seriously minded are more likely to go home to bed after work ceases than to dress up and go out for later forms of entertainment. For those otherwise inclined, no form of industrial regulation will be of any value in curtailing a tendency towards delinquency and moral turpitude.

(B) MARRIED WOMEN, OR THOSE WITH DOMESTIC DUTIES: If they have children, married women can spend the entire morning and noon hour caring for the children's needs and in anticipating those likely to arise in the afternoon and early evening. For some of these needs, however, it will be necessary to depend upon the presence and assistance of others. Inability to provide such substitution might work to the detriment of the family welfare or necessitate a change to some other form of employment. Industrial legislation cannot arrange domestic details to the satisfaction of all concerned. It is assumed that a married woman upon the completion of her work would immediately return home and not enter into the social affairs of the town. Hence no moral element enters the situation, provided that the children at home are not left unattended.

Moral Aspects

MUCH HAS BEEN written against night work because of the supposed temptations to which women are exposed. Dark alleys and darkened places about buildings, lack of supervision of factories at night, and all the supposed opportunities for moral laxiness to express itself have been set forth in lurid detail in many articles and reports. Possibly these conditions existed at one time, but times have certainly changed. The supervised factory has now become a place of great safety for women as contrasted with road houses, parked automobiles, and speakeasies, and in the atmosphere of a general laxity of law observance and enforcement. If women were discharged from work one at a time throughout the night, then possibly there might be serious objections raised. However, all would leave the building and scatter to their several homes at about the same time. Movie houses, churches, lecture and music halls, societies and libraries are not closed by law and regulation because women frequent them at night, or because the women might be accosted on the street by those of evil intent. Far too much has been made of the immorality that is supposed to lurk in dark places.

It is believed that the proposed plan of a double daily shift for the employment of women in industry does not constitute a physical burden upon a woman in reasonably good health. It appears to be an improvement upon the scheme now in vogue. As such it must be regarded as a suggestion for bettering the health and safeguarding the morals of women who by choice or necessity are gainfully employed.

Compensation for Loss of Remaining Eye

IN CHILDHOOD, the petitioner lost the vision of his left eye from disease. His right eye was destroyed at the defendant's plant by an accident arising out of and in the course of petitioner's employment. The industrial injury, plus the loss of the left eye during childhood resulted in blindness. The trial court awarded compensation only for the loss of the eye destroyed by the industrial injury and the employee appealed to the Supreme Court of Tennessee. He contended that he should have been awarded compensation for permanent total disability. The employee's permanent total disability, said the Supreme Court, was not the result of an injury but of an injury that destroyed the vision of one eye, plus the affliction that destroyed the vision of the other eye. The statute, prescribing as it does compensation for industrial injury only and measuring it by the specific loss of a member regardless of the effect on capacity to work, forbids the addition of the preexisting loss of a member by disease to a subsequent loss of a member through industrial injury, for the purpose of transferring the measure of compensation from the lower to the higher schedule. In prescribing compensation for injury to vision, the legislature did not consider the organs of sight as a unit. Each eye was considered separately, and compensation related to its specific loss; the loss of one eye constituting permanent partial disability and the loss of both eyes constituting total permanent disability. The judgment of the trial court was therefore affirmed. *Catlett v. Chattanooga Handle Co. (Tenn.)* 55 S. W. (2d) 257.—*J.A.M.A.* (August 5, 1933).

Workmen's Compensation

—A Complete Study of the Subject with Special Reference to its Medicolegal Aspects—

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VIII. The Physician

THE MOST important individual factor in the field of workmen's compensation is the physician. Upon him rest the responsibilities of this great social and industrial innovation. His conduct and his work impart by far the greatest single force in the harmonious working of this plan if it is to function efficiently. The recognition of his unique position in this work has been all too lightly stressed and will continue so until his full and rounded purpose is sufficiently analyzed and understood.

The physician, from the time of Hippocrates, has been the pivot around which all human social and industrial progress has revolved, and from the center of his activities has come our present social being. From the earliest times, when he began to delve into the intricacies of human matter and mind, he has been accorded the respect and admiration to which he is justly entitled for his achievements. There is no other profession or calling wherein the incumbent's devotion to the tenets of his teachers has done more to lessen his pecuniary remuneration. The practice of medicine is now undergoing drastic changes, and because of the untiring efforts of the physician to prolong life and lessen human suffering, his position is becoming more and more socialistic.

The Physician in Industry

WE ARE NOT, in the pursuit of this work, concerned with the physician as a part of the general scheme, but will confine ourselves to an explanation of his place in industry.

When the life of the people was devoted for the most part to agricultural pursuits, the physical ills were administered to by the now historic and much beloved country doctor. He was both physician and friend, the most vital single force in his community. He was physician and surgeon, for at this time the specialties in medicine had not been born.

Gradually there came the centers of population, the closer herding together of human beings following the development of industry; and as industry grew and more men were employed in a single enterprise, and accidents became more common. Machinery of all kinds was invented, built and produced, and more and more accidents occurred. Soon there were created distinctions between the rural and the urban practitioners of medicine, and the terms "country doctor" and "city doctor" came into use.

Some of the city doctors began to devote more time in one line of medical work and by reputation at least, became more proficient. Surgery began to grow as a specialty and the various branches of medicine were set up as specialties, one man devoting his entire practice to this and another to that specialized work. Along with this development the general store became a memory and merchants of special lines came into being.

I mention this to point out that the specialties in medicine were only a part of a movement toward special endeavor.

As the number of industrial accidents grew, there came a demand for doctors who would give attention to casualties. This work gradually drifted to the general surgeon, and quite naturally so.

Industrial organizations began to seek the services of doctors upon whom they could rely in case of emergency. It was not always an easy task. The employer was not always to blame and he was not anxious to accept responsibility for that which he felt was another's fault. Personal injury suits at law became common and the employer would avail himself of his common law defenses, such as assumption of risk, the fellow servant rule, and contributory negligence. The employer was faced with the necessity of having a friend at court and this friend must needs be the doctor.

The Contract Surgeon

THE EARLY practice was for the surgeon to operate on a fee schedule. He was at first permitted to set his own fees, but later he was retained on a set fee or a salary. The fees were

small and the salary was proportionately no more. The surgeon who had mounted the steps of fame and reputation could no longer be annoyed by trifling injuries, but he could be induced to officiate in the major cases.

For the general run of work then industry fell back upon the general practitioner, usually a young man fresh from college. The young man accepted these opportunities voraciously; although the salary was small, in fact so small as to amount to almost nothing, the opportunity for contact and advertisement, which the ethics of the profession did not permit, opened a door to building up a practice in a general way. When young Dr. Blank had sufficiently profited by these contacts, he was no longer so easily available for emergencies, and a younger man stepped in. Often these arrangements were looked upon with jealous eyes by the less fortunate practitioners, and there gradually grew up a profound resentment and contempt for a young medical man who would so lower himself as to become a contract surgeon.

To this day, the salaries paid by some employers are paltry. The railroad companies are perhaps the least considerate. Salaries of $200 to $300 a year with pass privileges are the emoluments received, but such an appointment is good advertising.

The same situation maintains as to a number of examiners for insurance companies. The returns come by reason of the family practice obtained through these channels of contact. Some insurance companies pay a reasonable fee, and there are now medical men who devote practically their entire time to insurance examinations of one kind or another.

There are certain industries, such as coal mining, lumbering, etc., located in isolated districts, where the contract surgeon looks after the workmen and their families and does the work of a general practitioner. Arrangements as to remuneration depend entirely upon the company and the doctor.

The Selection of a Physician by an Employer

IT IS NOT always a simple matter to select a physician. It depends, of course, upon the advantages that are offered. Usually it is a question of personal choice of the man of highest authority. This selection may be delegated to an official in some particular department, or he may be the choice of the president of the company. There are various reasons why this or that physician is selected, but it is seldom because of the ability that he possesses at the time he enters the service. The reasons are obvious, as has already been pointed out. It is true that after years of service the qualifications are developed and experience built up. It is also true that the selection of an experienced individual will make for better and more efficient service. Two major qualifications are necessary experience and, as was referred to in the chapter on Employers, *industrial-mindedness.*

As yet the employer has not been sufficiently educated to demand the services of a full time, efficient, experienced and well qualified industrial surgeon.

The time is not far distant, however, when this situation will maintain, but at the present writing it is not yet so.

Chief Surgeons

LARGE corporations may choose one of two methods. The chief surgeon, who acts only as an executive with a staff of assistants, or a chief surgeon who actually oversees and does most of the work himself. Of course this depends upon the size of the corporation or employer. However, a chief surgeon who has not come up from the ranks and knows nothing of the actual work can hardly make a good executive. It requires an infinite knowledge of all the little details; and if this is lacking a chief medical officer is but a chief, the medical officer means nothing. Sooner or later such an employer will pay the penalty, although he may not know it.

The Industrial Physician and Surgeon

THE POSITION of industrial physician and surgeon is, in fact, one of the most important offices in any industrial organization. It is not a small job, if it is to be done properly. It is the tight rope upon which the progress of the enterprise rests, for it carries the balance between the employer and the employee. Well organized employers appreciate this fact and have provided themselves with these services accordingly.

These services can be obtained in only one of two ways: a full time industrial physician and surgeon, or the services of an industrial physician and surgeon who is devoting his entire time to industry. If the employer has the opportunity and is in a position to afford a full time service, this is, of course, the method to follow, but under no circumstances should the one employed

for this work be permitted to engage in general practice. The small employer will do well to place his work with an organization doing industrial medicine and surgery, and in communities where there are a number of small employers, they may arrange for such service by combining their efforts to procure them.

Importance in Relation to Workmen's Compensation

THE FULL appraisal of the value of industrial medicine and surgery has not, as yet, been attained, but a gradual understanding of its importance is becoming known. Few employers and few hospital executives, are acquainted with the fact that there exists an American Association of Industrial Physicians and Surgeons with a membership of over 300. This membership is composed of well trained and qualified industrial minded physicians. It is one thing to be a mere plant doctor and it is quite another to be an *Industrial Physician and Surgeon.*

Inasmuch as the principle of workmen's compensation has been adopted by most of the states, the place of these men has been made more important, although it may be said that wherever there is industry, it should be afforded the facilities of industrial minded physicians. It is no reflection upon the general practitioner that he does not have this understanding; he is prevented by reason of his practice from acquiring it. His relation to the patient, both for the good of the patient and because of his obligation to the employer and society, is essentially different.

Again using a concrete example: Assume that Dr. Blank is engaged in general practice or general surgery and, in addition, is selected by some concern to render industrial service. Dr. Blank makes his living, primarily, in general practice or general surgery. He must remain on the good side of his patients, so to speak, if he hopes to retain that practice. He looks after the ills of all the members of the family. John is not only a patient of Dr. Blank but is also an employee of the plant which is being served industrially by him. John has been subject to headaches, and Dr. Blank has discovered that these headaches are due to a nephritis for which he is being treated. The employer knows nothing of this, and further, Dr. Blank, as John's physician, has no right to divulge this fact to the employer. He would be abusing the limits of his professional relationship.

John, while at work, sustains a "crack" on the head, a scalp wound, and for a moment is "knocked silly." Dr. Blank is called and renders service for which he is compensated by the plant, either directly or through a workmen's compensation arrangement. John's injury heals, but he now complains of headaches and is unable to work. He remains off, claiming that the injury is responsible for his condition.

Dr. Blank knows that John's condition is not due to injury, but John is his patient outside the plant. It requires no microscopic analysis to see just what position Dr. Blank is in. If he tells the employer the truth, John's compensation will end and so will John's relations with Dr. Blank. So the Dr. takes up the merchants' slogan, "The customer is always right." John prolongs his disability until he gets good and ready to return to work, and in the meantime compensation is being paid. When John does return to work depends entirely upon how John feels about it, and if John has additional accident insurance and plant relief benefits, no telling when he will feel able and willing to resume a gainful occupation. This is by no means an extreme case.

Now let us see what happens when John is cared for by an industrial surgeon. Assume that John was examined by the medical department when he made application for work, and assume further that his general health at the time of examination disclosed no abnormalities. The nephritis (inflammation of the kidney) has developed since his employment began. The same bump on the head is sustained. The injury is attended by an industrial physician and surgeon. Here is where the picture changes.

John knows of his condition and knows that the injury is not the cause of his headaches. He also knows that the obligation of the plant surgeon to him is only to take care of his injury. The plant surgeon is not looking to John for a future private attendance or a maternity case in the family, therefore John builds up no false hopes to begin with. His injury healed, he returns to work like a good fellow and still remains under treatment for his nephritis with his family physician. The limitations are well defined. Assume, however that John tries to "put one over" on the plant doctor and build a claim of headaches as a result of the injury. The industrial physician, by reason of his experience, having made a thorough examination as to the possibility of the injury being the cause and finding no reason for the condition of which John complains, may reasonably inquire who John's family doctor is. John will probably tell him, but if he does not, investigation is not diffi-

cult. When the plant doctor knows who the attending physician is and makes inquiry of him the family doctor owes a professional duty to extend the information.

It is because of this and similar situations that the most highly developed cooperation is possible within the profession when the family doctor knows that the plant surgeon is not attempting to "steal his business," and when the industrial physician and surgeon limits his work to industry, he is even deprived of the incentive to steal it, for he would not know what to do with it after he had it. It is simply out of his line of work. The importance of this relation cannot be too strongly stressed. The industry derives the greatest benefit from the cooperation of the outside practitioner who, incidentally, does a great service to his patients. The family doctor who "shades a claim" although he may feel that he is deriving some profit for himself, does not treat industry or his patient fairly.

The Plant Medical Set Up

NOW THAT we have definitely classified the position of the family physician and the industrial physician, let us proceed to an explanation of efficient systems within the plant. Take first a plant of moderate size, sufficiently able to employ a medical department. The unit may be small or large but the same principles of procedure apply. We must assume a plant of sufficient size, say about 1000 employees. The employer, first of all, must recognize the importance of his medical department in its full sense. It must appear to him of equal standing with any of the major departments and must be treated as such. The doctor in charge should be selected for his experience and ability and should be compensated accordingly. The employer does not hold the services of a manager on a paltry salary, and he should not expect to get the services of a high class industrial physician and surgeon for less. This is the greatest single factor in retarding the inclination of a physician to pursue this calling.

Once the services of an industrial minded physician and surgeon are procured, as the head of his department he is entitled to the full responsibility and should be answerable only to the head of the organization.

It is advisable here to mention the importance of personality to be sought for. Beside the fact that he must know his work, he should be affable, amiable and congenial. Above all, he should display an interest in the employee that reflects sympathy and understanding. He will never get anywhere with the men in the plant if he is "high hat"; on the other hand he will get no further if his ability is limited to a "pat on the back." He must be firm but gentle. He should remember that he is charged with the duty of rendering satisfactory service to all of the employees in the plant, regardless of the size of the employee's job. The common laborer is just as subject to human emotions as the president, perhaps more so, because his outlook on life is entirely different. Those experienced in this class of work know only too well how true this assertion is and further that the employee is the greatest critic in the world, along this line.

To say that the physician should please every one equally would, of course, be ridiculous. There are some individuals who simply refuse to be pleased under any circumstances, but I have pointed out that one such is an undesirable employee and should be eliminated from the organization. Minor complaints as to the surgeons conduct, should not be reviewed by any higher authority than himself. He has been given a very definite piece of work to do and as in any other department, if he does not produce, he should not remain in his position.

No one is better qualified to weed out the chronic fault finder, and it is as much the industrial physician's duty to maintain plant morale as it is to know how to dress a wound.

The full time medical department executive need not, however, possess the amiable qualifications of the man who does the work of the plant employees for the reason that his contacts are limited as to the men, but if he does not possess them himself, he should demand them in the men under him who do the actual work. I am referring here to the medical department head of a very large concern which employs a medical staff.

If male attendants or female nurses are employed, the same qualifications should be demanded. There are many such; it only requires the necessary effort of selectivity. Employment of these persons because of "pull" or personal choice of officials of the plant should be tabooed unless, of course, they are equipped with the qualities already mentioned.

With the selection of a proper medical personnel, little difficulty will arise, but it will not be amiss to point out some of the minor relations on the part of employees when injured.

In any event, prompt attention is the first requisite. An injured employee is not ordinarily

overly patient to begin with. He is the one who is suffering, and it is the duty of the physician to attend this injury without delay. Such attention keeps the injured one up before he has an opportunity to let himself down. As soon as he is brought into the presence of the physician his anxiety is stayed. Another valuable asset is the fact that so much more can be done if the waiting interval is lessened. It is common practice for us to suture minor wounds without the least suggestion of an anesthetic. What pain there is, is of such short duration that the injured one appreciates more the fact that he is being "fixed up" quickly. He is willing to undergo just a little more pain to "get it over with."

Two procedures that cause additional pain are the closing of open wounds by suturing or the opening of closed wounds, such as punctures, embedded foreign bodies or inflammatory areas for drainage. I need hardly mention the advantages to be gained by using sharp knives and efficient suturing devices. Some men prefer needle and suture material, other prefer clips. Skin clips are our method of choice for ordinary use. We have on hand four sizes. Of course there is only one thing any suture does, and that is maintain apposition of separated tissue. Large clips, by reason of their wider bite, will often hold deeper tissues without the necessity of buried sutures. This lessens the necessity of placing a foreign substance within the wound, lessens the liability of infection, and permits more rapid healing. Clips, of course, are more readily removed and give rise to less pain on removal. The removal of a through and through suture always adds the possibility of infection, as it is drawn through in the process of removal.

When incision is required, a quick effective cut is necessary, but it can only be obtained with a good sharp edge. In incising the inflammed areas, the greatest pain results from pressure. A good sharp knife requires very little pressure, consequently causes less pain. The great benefits come in the conserving of time in the procedure.

The reduction of fractures and dislocations is ordinarily more painful, but here again prompt attention is saving to the patient. I have reduced many fractures and dislocations where the injured has been brought to attention *within a very short time after injury, without an anesthetic*, which could not have been reduced with as little discomfort or as efficiently without an anesthetic, had the attention been delayed for an hour or more. It is not only important to note the saving in pain to the injured, which of course, is by far most important to him, but there is also a saving in procedural expense.

After the wound is cared for, the next procedure is placing the dressing. The nature of the wound suggests the type of dressing. Wounds intended to be kept draining naturally demand a wet dressing, those intended to be kept dry obviously require a dry dressing. The most efficient and satisfactory dressing which our experience has developed is a solution, which, when placed, retains sufficient moisture for a reasonable time and then dries *in situ*. This dressing may, when occasion requires, be kept moist by the simple application of sterile water. It is promptly returned to a wet dressing without disturbing it in the least.

So often the injured has a desire to institute treatment of his own after he has received attention at the plant. This has already been referred to. Proper guidance and instruction at the time of dressing will usually prevent such interference.

The question of returning to work or losing time should be considered at this time. The suggestion to be made requires an immediate appraisal as to the character of the injury, the nature of the employment, and, particularly, the character of the man himself. His own analysis of his capability is not to be lost sight of. He may know within limits, better than the doctor, whether he can or cannot perform his duties. Caution should be exercised however, when there is any likelihood of a bandage being caught in revolving machinery or a foot or hand injury if the workman is engaged in an occupation which requires climbing, or a head injury, unless of very minor importance.

Head injuries particularly should be carefully guarded as to prognosis. A period of lucidity maybe very deceiving, and the danger of dizziness and fainting may, if it occurs, cause another injury through a fall. We have had it happen that a person attended would leave the dressing room and faint in the corridor or later on the street. This cannot always, by any means, be foretold, but it is worthy of note to the extent that every possible safeguard should be employed.

Fainting often occurs while the injured is being attended. Our dressing table is so arranged that we work from the opposite side of the table and have constant observation of the patient. The nurse is kept at hand and on the slightest

sign of syncope supports the patient and we proceed with our work while nature provides the anethesia. A cold towel to the face and back of the neck will usually restore the patient at the proper time. When this occurs as soon as the dressing is completed, we insist upon the patient lying down for a period of time sufficient to restore his equilibrium.

An interesting incident once occurred which throws some light upon the stages of syncope. A young Jewish boy has presented himself, with an infected finger. This, by the way, was the result of a neglected very minor puncture wound. The infection was incised and the wound dressed. As he approached the door of the record room from the corridor, he wobbled and leaned against the door frame. He said, "Oi, I am seeing black," expressing a still existing consciousness of the beginning of something gone wrong. He acquired a vacant stare but still retaining some degree of consciousness added "I am seeing nutting," then promptly lost all consciousness. Had it not been for the fact that he was observed in sufficient time and supported, he might have sustained a severe bump in addition. Scalp wounds from falls due to fainting and epilepsy are quite common and we have had occasion to suture a large number of them.

Sometimes those injuries form the basis of a borderline case, especially when the attack occurs in the course of employment. This question is also raised in cases where various gases are presumed to be causative factors.

As an interesting circumstance which presented itself some time ago, an elderly employee was engaged in the manufacture of lacquer. The lacquer vats require cleaning at certain times, and various substances of highly volatile character are used. In this instance, the employee working in this atmosphere fell over at his work. The case was sent to the hospital with a history of having been overcome with benzol. I arrived at the hospital just a moment before the patient, who presented the following picture on admission: An elderly gentleman, fairly well nourished, reflecting a mental state bordering on delirium on one hand and a partial coma on the other. His speech was only a muttering, there was no orientation but a recognition apparently of the fact that something was going on about him. His pulse was slow and full and his blood pressure was high. He fell into a complete coma with a general muscular flaccidity. He was put to bed with a tentative diagnosis of benzol poisoning, the symptoms being suggestive and backed by history. Later observation disclosed a partial return to consciousness with a well defined right hemiplegia. By this time members of the family arrived and to them was explained the fact that there was some sort of cerebral lesion, probably a cerebral hemorrhage. The family was very mute as to disclosing any previous history and when I suggested calling in their family doctor for consultation, they could not very well object and so they acquiesced. Right here is a wonderful example of the importance of cooperation between the industrial physician and the family physician and the importance of maintaining the proper ethical respect. The family physician arrived and substantiated the diagnosis. More than this, he had treated the patient several years prior for a similar attack. The family, however, did not concur in the diagnosis, and the case was turned over to the family doctor for treatment and we gracefully bowed out. Later the old gentleman improved sufficiently to be taken home, but died about a year later. The family is, of course, attempting to build up a death claim and although they have not succeeded in their efforts so far, they have caused several commission hearings and may appeal from the findings of the industrial commission. The commission disallowed the claim. Although there is hardly a possibility of any recovery because their own family physician must be an adverse witness, yet had we continued in charge of the case, we would have been accused of testifying in favor of the employer because we are employed by him.

As I have pointed out, the immediate reporting of any case in the plant is of utmost importance and should be first observed by the plant physician. Time and again cases which would result in trouble and annoyance are properly classified from the beginning, and the very suggestion of financial recovery is offset from the start.

The question of epileptic seizure in the course of employment frequently occurs. The attack may result in personal injury, probably a scalp wound or even a fracture. We have experienced this picture a number of times, but the analysis is rather simple if the patient is seen in the attack, which again points out the importance of early attention. The findings and history will usually solve the problem. Some cases have been allowed by the commission, others have not, but the greatest problem arises when one attempts to find the differentiating facts upon which the commission bases its findings.

It would be an endless task to attempt a review of tabulation of all of these cases and in the end would mean very little. The time to get the data is when the accident occurs. Immediately after the attention is rendered, the record should be made.

Our practice is to make this record at the time suggested and to make it as complete as possible. It is rather embarrasing to find that the omission of some apparently insignificant notation makes so much difference in a case when the record is referred to several months after the accident. After our file record is made we have the claimant sign the proper form.

This procedure stars the case *right* from the beginning.

This procedure has been worked out thoroughly and will prevent any difficulty in the vast majority of cases. Some employers whose understanding of the procedure is not quite clear, insist upon drawing their own forms. This, of course, must be done by the employer, it be a part of his duty to report the case to the commission, but in our practice we are simply representative of the employer and do this work for him. In jurisdictions, and this prevails at the present time in Ohio, various statistical organizations have been set up to serve the employer as an audit to his workmen's compensation accounts with the commission. These organizations, whether because of a lack of understanding of the efficient operation of this plan or in a valiant attempt to place an added value upon their services, have caused their clients, and incidentally our organization, much needles annoyance.

Padding Fee Bills

I KNOW of no more appropriate place to discuss this subject than right at this time. Fee bills can be padded, may be padded, and sometimes are padded, as investigation has disclosed. There are a number of reasons why this is so and why it is possible. There are also many times when it cannot be discovered either by the statistician, auditor or the employer until it is too late.

To illustrate: there are several ways which present themselves although some in a strict sense are not paddings. Ordinarily what is meant by padding is the making of charges for which services have not been rendered. We will assume a small employer permitting his injured workmen to select his own physician. The employer has no connection with an industrial physician and surgeon or an organization rendering such service exclusively. Naturally the physician sought by the injured employee is his family physician. The services are rendered for the injury. Often the physician views the employer and the industrial commission in the same light as the employee, this view being that the state (in Ohio) pays the bill and according to accounts, the state has plenty of money. The injured workman may also be slightly indebted to his family physician who may have been, in the past, particularly lenient in his charges. This opens the door to sort of square past accounts.

There are also many delays at this juncture for the employer may not have made out the form and the physician has kept but an incomplete record of the case, or again may rely upon his memory as to the number of dressings, etc. But we will assume that the form has been completed by the employer and it only remains for the physician to make out the fee bill. The question of a few dressings more or less will not make any particular difference, so why not make it a few more. The fee bill is made out accordingly. The employer has no check on the number of times his employee has been treated; the doctors records may be indefinite, and the employee may have in the interval honestly forgotten, so the fee bill goes through.

Our plan is a system of complete check up, not only on the part of the employee but also upon ourselves. Errors are possible, of course, but they are very unusual and, furthermore, may be discovered at a moment's notice. Conscientious errors are always open to explanation and easily corrected.

Another abuse of the fee bill is in the case where a physician is employed by an employer on a salary and an arrangement whereby a fee bill is filed for each case but the payment warrants are indorsed back to the company. This is a vicious practice and the physician who lends himself to such an arrangement should be condemned.

Another abuse is the filing of fee bills over the signature of the doctor when the services have been rendered by an attendant or nurse within the plant. These services are charged by the physician although he may never see the case.

This is bad practice and should never be condoned.

The practice of delegating duties is more common in large organizations, and although no fee bill is rendered on the individual case, a great

deal of embarrassment arises in hearings or litigation.

The employer, more than any other, is primarily at fault where such procedures are in vogue. He should not permit it, but often he is a voluntary part of the system. The correction lies in the proper organization of his medical department or the placing of his work with industrial physicians and surgeons in whom he should have confidence, not only for their ability but also for their integrity.

Medical Fee Schedules

THE ADVISABILITY of a set schedule of medical fees has been discussed pro and con. It is contended on one hand that set fees are tending too much to socialistic medicine; on the other hand it is held that it is the only system of control upon which to base costs.

Incidentally, medical fees are but a proportionately small cost of the operation of a workmen's compensation system. I mean an actual cost for attention to legitimate injuries. The enormous cost comes through special examinations, unwarranted x-rays, large fees allowed to special surgeons for work that is remote to the injury. These are the causes of execessive medical expense, and although the industrial physician and surgeon is not responsible for them nor does he share in the benefits, he receives the abuse and condemnation unjustly. The statistician merely chalks it up as a medical expense.

The fee schedule is sometimes inadequate, but for the most part is just. The only way it can be applied on any satisfactory basis is when this class of work is limited to the attention of only industrial physicians and surgeons.

Occupational Diseases

A WORK of this character would not be complete without some comment upon the subject of occupational diseases. This subject, in my opinion, is quite misunderstood by the profession generally, and especially by the various departments of health.

There should be no classification of occupational diseases separate from industrial accidents. An occupational disease is as much an accidental damage to tissue as an injury if it arises out of and in the course of employment. Attempts are made at listing certain diseases which are alone recognized as occupational diseases. The great difficulty arises in drawing a line of distinction. I will not attempt a detailed discussion of the subject.

In a recent decision in an Ohio case on carbon monoxide poisoning the Court said:

"Carbon monoxide gas poisoning is not an occupational disease but is an accidental injury, and is, therefore, compensable under Section 1465-68 of the Ohio Workmens' Compensation Law." Court of Appeals of Carroll County, affirming the judgment of the Common Pleas court in *Tolson et al., vs. the Industrial Commission of Ohio.*

Commenting on scientific data offered in the case which grew out of the death of Tolson after he had inhaled monoxide gas fumes in a mine shaft, the Court of Appeals said:

"It is difficult to believe that this odorless, invisible, deadly thing that causes death does not, by doing so, inflict an injury upon a human body, because it is no more a disease than when an intending suicide takes a deadly poison which attacks and degenerates certain tissues of the body, injuring the blood, depressing the heart action, increasing respiration, producing unconsiousness and death, which certainly has never been recognized as a disease * * * The meaning of the word 'injury' as used in workmen's compensation acts or in similar connection, has come before the courts for consideration on numerous occasions, and, while some have applied a limited and narrower meaning, many more have applied the rule of liberal construction * * * The spirit of the Ohio compensation law, its purposes, its intent, indicate and favor a reasonable liberal construction, and, if that be true, it would be difficult to imagine a more meritorious claim than that of Tolson's dependents."

If the principle announced in this case is sound, and it unquestionably is, then the same principle applies, without exception, to all occupational diseases.

The topics discussed in this chapter should awaken thought on the part of the employer particularly, and also the physician in general practice. I have attempted to show the distinction as to the practice of industrial medicine and surgery as being most especially a branch of the practice of medicine. Many obstacles on the part of medical organizations have been thrown in the way of progress, and the employer has at no time been able to get this information first hand. As has been pointed out, an employer is neither too small nor too large to be without a proper and efficient medical service to his employees. It is but a question of understanding and the adoption of the proper procedure when it is understood.

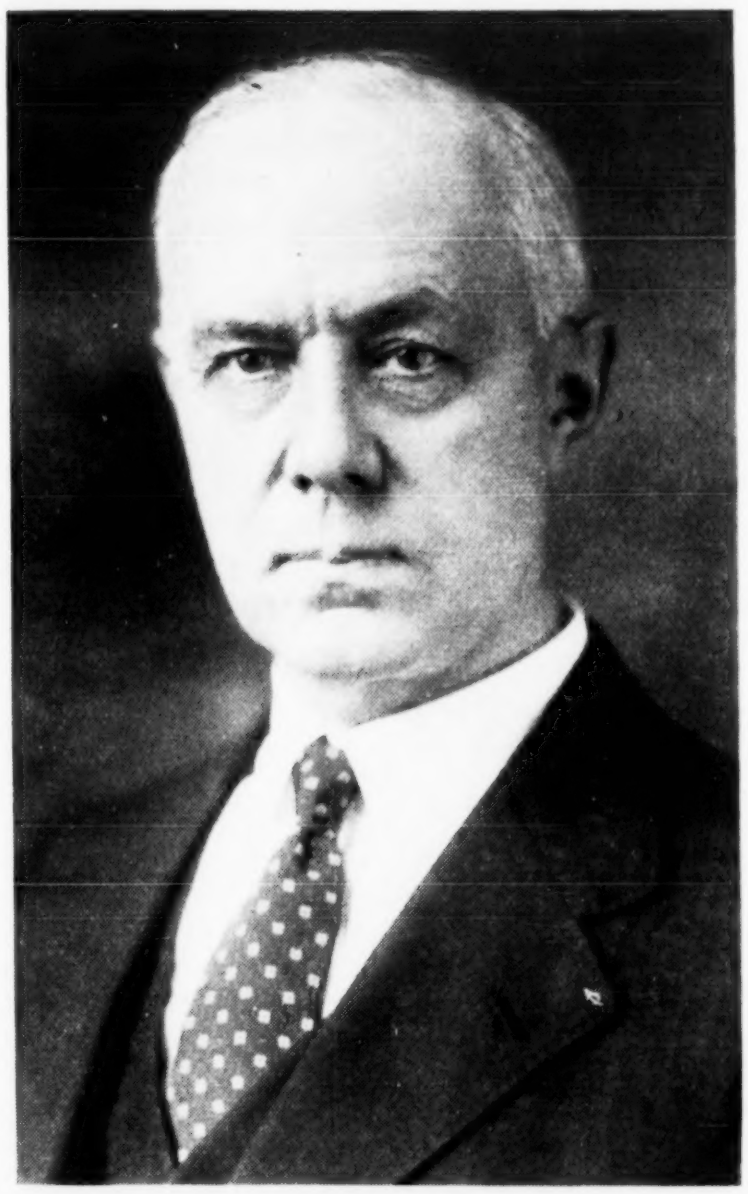
Who's Who in I. M. & S.

—The Pennsylvania Spelling of 1682, the Quaker "Cheyney", is Responsible for the Illinois Pronunciation of 1934— Cheney, as if Chaney—

OUTSIDE views contain the elements of perspective; inside views nourish the embryo of tradition. It is the unusual mind that accomplishes both views.

Such a mind will seem impelled to use time and adapt circumstances in the identification of an ideal. It will move toward an expression of vision, consciously as a matter of individual desire, unconsciously as a matter of intellectual destiny.

Under the urge of the high qualities of a mind of this type, Dr. Nathan Smith Davis, as of time past, founded the American Medical Association; Dr. Franklin H. Martin established the American College of Surgeons. And now, driven by the same kismet of mental and spiritual compulsion, Dr. Volney S. Cheney, as of time present, has visions of the importance and the future of the American Association of Industrial Physicians and Surgeons.



VOLNEY SCHAFER CHENEY

THE DOCTOR in industry is truly a "specialist." But as it applies to him the term has an individual and special meaning. He does not specialize in any branch, or part, or kind of medical practice. Instead, he specializes in the application of all branches and parts and kinds of medical knowledge to the specific situation wherein the patient is the employee of an employer, and wherein the relation between himself and his employee patient is maintained under the shadow of the fact that the employer, directly or indirectly, will pay the bill.

The employer is thus a third party in the industrial medical picture. And he, as employer, is there, in final essence, as a matter of business.

This brings the doctor in industry within the scope of economics, and justifies Dr. Cheney's own conclusion, arrived at from his own experience, that "the claim of the physician in industry to being a specialist is not based upon his possession of any peculiar *medical* knowledge, but chiefly upon his knowledge of non-medical things * * * To specialize in industrial medicine requires a knowledge of certain social, economic and administrative problems related to industry that are not in the medical curriculum * * * The difference between a physician in general practice and an industrial physician consists of the latter's appreciation of the problems of industry and the application of the art and science of medicine and surgery to those problems. * * * He must have a general knowledge of industrial relations, including employment methods, labor turnover, job analysis, apprenticeship, pensions, insurance, rest periods, absenteeism and welfare problems, and a working knowledge of the workmen's compensation law of his own state — and of other states also if his industry is national in scope."

DR. VOLNEY SCHAFER CHENEY was born at Columbus, Kansas, in February, 1874. Descended from the Quaker Cheyneys, who settled on the Brandywine, in Chester Co., Pa., in 1682, he is the fifth generation of physicians. He got where he is by reason of those qualities of independence and persistence which are characteristic of American individualism, his history is one of those personal epics of effort which write themselves under the spur of *lassez faire;* which may not be so often written under the anticipated new social order. His father, Silas Cheney, M.D., died in 1875, and baby-

hood grew into boyhood in an orphanage at Mt. Union, Ohio. Schools at Massillon, Ohio, and St. Joseph and Kansas City, Mo., were followed by matriculation, by examination, in the Preparatory School of Washburn College at Topeka, Kansas. After four years there he went to work as a collector in the freight office of the Chicago Great Western at Kansas City. A year later found him in Chicago, for the World's Columbian Exposition, where he was successively hotel night clerk, head checker for the American Restaurant at State and Adams Sts., and assistant manager of the old Woodruff Hotel at 21st and Wabash. After a period in hotel management in the Adirondacks, he entered Northwestern University Medical College in 1895, and "worked his way"—paper route in the mornings, restaurant checker in the evenings. After an hiatus in his junior year—managing his stepfather's hotel while the latter was in the Klondike—he went back to Northwestern, graduating in 1902, sixteenth in a class of 120.

Going right into industrial medicine, which was then in its bare beginnings, he became "company doctor" for the Illinois Steel Co., at Joliet, Ill. About two years later he set up in private practice at Bluffton, Ind., where he was appointed City Health Officer and County Physician. Then, for reasons of health he went west, rode the Wyoming range for a year, was chief clerk at the Alvarado Hotel, Albuquerque, N. M., for about the same period, and then was Camp Surgeon for the American Lumber Co., at Kettner, N. M. Followed two years in private practice at Willard, N. M., where he was also the local druggist and president of the Chamber of Commerce. Then for the three years ending in 1915 he was Surgeon for the Albuquerque & Cerillos Coal Co., at Madrid, N. M., in the community life of which he was also Justice of the Peace, Amusement and Recreation Director, and Deputy Sheriff. In October, 1915, he married Bertha E. Turner, of San Pedro, N. M., and in February of the following year he went to Chicago as Surgeon for Armour & Co.'s Chicago plant.

Since 1920 he has been Medical Director, Armour & Co.

He is a Fellow of the American Medical and American Public Health Associations, of the American College of Surgeons and the American Association of Industrial Physicians and Surgeons; past president and charter member of the Central States Society and the Chicago Society of Industrial Medicine and Surgery, and member of the Chicago Medical and the Illinois State Medical Societies; and is and has been for the past seven years Secretary-Treasurer of the American Association of Industrial Physicians and Surgeons. Among other affiliations are the Chapter, Commandery, Shrine, B. P. O. E., and Sons of the American Revolution.

He *was* Republican, but is now an ardent admirer of F. D. R. He asserts a leaning toward socialism, but that is only his way of expressing the profound humanitarianism that pervades his life.

FOR VOLNEY S. CHENEY, M.D., *is* profoundly humanitarian. Not so much in the abstract sense that characterizes the medical scientist who makes a career out of the search for the cure of one disease, as in the concrete sense that meets the human individually and humanly, and renders him service man to man. His reaction to those about him and to his work with them is much less a reaction to the group or mass of which they are unit members, much more a reaction to each of them as an individual problem, the sum total of their entities being a vague and varying aggregate somewhere in the background of his thought. He is essentially human, essentially personal, in his contacts, saving the impersonal and *en masse* point of view for the very necessary adjustment to the economics of industrial medicine which is so much a part of the work of the doctor in industry.

He has a free clinic for treatment of Mongolian idiots and mentally defective children; has treated 22 cases of Mongolism in the last seven years.

To those who know him well he reveals that Leigh Hunt's *Abou Ben Adhem* is his favorite poem—which impresses them as nothing more than an iteration of the obvious, for it is very plain that his idea of a fitting reward at the hand of the Higher Power would be the Recording Angel's accolade that he loved his fellow man. This natural and spontaneous quality, characteristic always, has been tempered and mellowed and refined to the purest expression by personal tragedy. It was the apotheosis of sorrow for him, M.D., to suffer seven months of helplessness during 1930 while his boy, Louis, 12 years old, lay dying of acute lymphatic leucemia, about which medical science as yet knows so little.

THERE were Crowder, Fisk, Geier, Harvey, Sawyer, Shefske, Shoudy, Patterson, et al., —and at conventions of the A. M. A., they used to have meetings of their own to talk about

industrial medicine and surgery, because industry was the field of their practice. In 1916 at Detroit the periodicity of their gatherings flowered in the organization of the American Association of Industrial Physicians and Surgeons. At the first meeting at Chicago two years later Dr. Cheney identified himself with this group. In 1926, when Dr. Rector gave over the secretaryship, Cheney was appointed to succeed him.

A. A. I. P. & S. is Volney S. Cheney's avocation. He wants to see it grow and flourish.

—to the end that every physician and surgeon who is qualified to specialize in the practice of his profession *in industry* will be an active, interested member,

—to the end that other Associations of I. P. & S. shall affiliate with it, and

—to the end that it may have its own ultimate dignity, and its own combination of the best in medical ethics and skill with the very best in executive ethics and ability.

Significances and Coincidences

INTERESTING in connection with Dr. Edward T. Wentworth's study, "Treating Chronic Osteomyelitis," in *Industrial Medicine* for November, 1933, at p. 307, is the following on p. 1104 of Hervey Allen's great story, *Anthony Adverse*: "On the first of April, 1804, a helpless-looking West Indian trader had turned out to be H.M.S. or U.S. something in disguise. There was no time to find out which. Five broadsides of grape and canister had sickened curiosity, and Dr. Mitchell had been summoned to Barataria to saw off legs and arms, set bones, sear stumps with boiling oil, and probe for bullets, while strong men made whimpering noises like nestsful of kittens. He returned looking pale, and with the entry in his notebook that wounds infected by bluebottle flies healed mysteriously well, if you just let them alone."

AN M. D., PROMINENT in surgical circles, says that *Industrial Medicine* should be more "scientific." He is outvoted, however, by numerous M.D.'s of similar prominence who say that *Industrial Medicine* is "scientific enough." The connotation of all the comments involves the amount of scientific matter contained in the successive numbers; the implication is as to more of the scientific in each issue, to the exclusion, perhaps, of the practical and the human. Our conception of this magazine is that it should be *thoroughly scientific* in the part of it that is devoted to science, *soundly practical* in its practical applications, and *intensely human* in both—with the emphasis on the *human*, if any special emphasis should be needed.

DR. LAUTENSCHLAGER'S recent candid analysis of the so-called "lost time" accident brings to mind an article in *Industrial Relations* the predecessor of *Industrial Medicine*. The article was written by Hugh A. Ptolemy, Safety Supervisor, Public Service Company of Northern Illinois (March, 1932) and treated of the company's methods of *preventing* accidents, particularly electrical accidents. An inspired compositor, setting "lost time" in the title, made it read "last time." In view of the subject matter—and the editors' opinion that there should *never be more than one* of many kinds of accidents—they let it ride: "Last Time Accidents."

THE FELLOW SERVANT doctrine had a very reasonable basis as an employer defense when the employer was compelled by general conditions and labor unions to treat with his employees *en masse*. So long as he was unable or not permitted to select a proper man for a dangerous job just so long was he entitled to the defense, when an improper man in a dangerous job injured another employee, that this injury was caused by a fellow servant. The abolition of the doctrine as a defense and the substitution of compensation insurance can only stand up under any examination of social economy so long as the employer is permitted the direct contacts with the employee which will minimize the risk he invariably runs in hiring anybody for any kind of work—since human nature is as it is.

A PREGNANT sentence is that one at the end of the letter Dr. A. M. Harvey, Crane Co., Chicago, received from a London, England correspondent (p. 56 herein): "Silicosis is also a racket in this country . . .". On p. 60 is a summary, by A. C. Hirth, Owens-Illinois Glass Company, of certain legal phases: "A verdict of $10,000 against the company had afterwards been set aside . . . on the ground that no negligence on the part of the employer had been established . . . all such cases should be tried under the Workmen's Compensation Act. There was no need of a jury. The evidence should be presented to commissions, as was the practice in Canada and Great Britain. He referred to 128 cases against one employer in St. Louis, which had netted $100,000 for one attorney."

Our Problem Page

—V. Caisson Work—

THIS is the fifth of a series of articles in which important problems of industrial medicine and hygiene will be discussed. In the form to be used, the problem in its essentials will be briefly stated, and the discussion will follow. Suggestions from readers will be welcome and given due consideration in the selection of future subjects.

PROBLEM: We have a number of men who are exposed to the hazards of caisson work and have had several alleged cases of compressed air illness. Please give a general discussion of the factors which predispose to this type of disease and also as to the prevention and cure.

DISCUSSION: Compressed air illness or caisson disease occurs among divers or tunnel workers, following exposure to compressed air; the symptoms arise only after too rapid removal of pressure (decompression) which liberates bubbles of gas in the already supersaturated body fluids and tissues.

There are certain predisposing factors in the production of this abnormal condition. These may be named as follows:

1. *Degree of pressure.* Other things being equal, the number of cases of illness increases directly with the degree of pressure. Haldane, a British investigator, believes that there is very little illness resulting from pressures up to plus 15 pounds, that symptoms begin with plus 20 pounds, are somewhat rare up to plus 30 pounds, but are serious in frequency above plus 30 pounds. Haldane has never heard of a case with fatal consequences below plus 29 pounds. On the other hand, at the East River Tunnel the lowest fatal case occurred at plus 28 pounds pressure. From a wide practical experience, Jatt considers that pressures up to plus 27 pounds may be regarded as free from risk of serious developments.

2. *Length of exposure.* From a number of statistical statements, it can be concluded that for practical purposes saturation occurs after three hours work under pressure, for the average man.

3. *The personal equation.* (a) Efficiency of the circulation is one of the five qualifications for good air workers. Predisposing factors to be noted here are debilitation from disease, malnutrition, from alcoholic and other excesses; constipation; chronic fatigue; the effects of cold and the lack of exercise during decompression and afterwards. (b) Organic diseases, especially arteriosclerosis, heart lesions, respiratory diseases, all interfere with rapid desaturation. Anemia, edema, and status lymphaticus have all been reported in some of the fatal cases. (c) Men from 17 to 30 years of age are the most desirable for pressure work, on account of their efficient general condition and the usually good condition of their circulations. Beyond 30 years the risk of serious illness increases, and with few exceptions men over 40 years of age should be excluded. (d) Fat men are notoriously ill-fitted for work in high pressures. This is because of the fact that the large amount of fat in the body prevents rapid desaturation of the tissues. (e) Fatigue probably plays an important role by impairing the efficiency of the circulation.

4. *Atmospheric conditions* above ground have been thought by some to affect the incidents of compressed air illness. This is questionable.

5. *Noxious gases.* The possible presence of injurious quantities of carbon dioxide, carbon monoxide methane, hydrogen sulphide or nitric oxide in a tunnel or caisson may be predisposing factors.

The one main and exciting cause of compressed air illness is too rapid decompression.

The chief symptoms in order of their frequency are as follows: (1) pains in the extremities or abdomen in about 88% of all cases of cassion disease; (2) dizziness, present in about 5%; (3) central nervous system involvement in about 2.16%; (4) difficult breathing or "chokes" in over 1½%; (5) prostration of moderate degree, with body pains, in about 1.25%; (6) collapse with unconsciousness in about ½ of 1%.

The *outlook* may be stated as follows: About 90% of all cases of "bends" can usually be entirely relieved by treatment and 99% have been in large part relieved by recompression.

Treatment resolves itself into two kinds, preventive and active.

1. *Preventive treatment:* (a) *choice of men* (as noted above); (b) *hygiene of the workers;* this includes plenty of sleep, a nutritious diet (with little fatty food), avoidance of alcoholic and other excesses, exercise of the limbs during

and after decompression, and regularity of the bowels. (See special rules to be strictly observed by compressed air workers). (c) *The amount of pressure.* This is of course the greatest positive factor in compressed air illness. At the same time, however, it is a point which is practically beyond control if work is to be accomplished at great depth. Instances are on record where people have experimentally undergone a pressure of plus 92 pounds, without accident, but probably plus 50 pounds must still be considered a practical maximum pressure for construction work. (d) *Length of exposure* literally means length of shifts. The question of proper limits for working shifts at different pressures is still open to debate. The New York State law for caisson work probably has this matter standardized as well as any group at the present time. (You can probably get a copy of this law by writing to Dr. Leland Cofer, 124 E. 28th St., New York City). (e) *Method and duration of decompression.* Uniform decompression is the most universally practiced method and consists in reducing the pressure at a constantly uniform rate, namely one pound per minute, two pounds per minute, etc. This is also given in the New York State law.

2. *Active treatment:* (a) *Recompression.* This is done through specially constructed recompression chambers called "medical air locks." (b) *Palliative Measures.* These consist of exercise, massage and inhalation of oxygen both in and out of "medical locks." Counter-irritation, heat, electricity, liniments may also be used. The use of anodynes and hypodermic stimulation in case of collapse.

Dr. Erdman of New York City has formulated the following rules for workmen: (1) never go on shift with an empty stomach; (2) be temperate—avoid alcoholic liquors; (3) eat moderately; (4) do not sleep less than seven hours daily; (5) keep the bowels regular; (6) extra outer clothing should be taken in the tunnel when going on shift. This should be worn during decompression in order to avoid chilling during that period; (7) keep arms and legs in motion while coming out; exercise in the lock; (8) remember that slow decompression means safety and a freedom from caisson sickness; (9) hot coffee, a warm shower and brisk rub-down after each shift will be of great benefit to each worker's health; (10) report to the doctor in charge of any compressed air illness at once; do not give men suffering from compressed air illness any intoxicating liquor; (11) if taken away from a plant on account of sickness, report at once to the doctor in charge; (12) wear an identification badge so that police officials will know what to do with you in an emergency; (13) stay about the works for at least one-half hour after locking out—one hour is really recommended; (14) the examination of all air workers by the doctor every two months; (15) the examination of all new men after working the first half shift; (16) absence from work for 10 days or more, for any cause, requires a re-examination by the doctor before a man will be permitted to work in compressed air; (17) no man shall work more than two periods in any 24 hours.

Workmen's Compensation Costs

IN A LETTER to the "Times," Sir John Collie, whose experience with the medical aspect of compensation cases is unique in this country, points out that the official estimate of the cost of compensation is $60,000,000 a year and that this probably errs on the conservative side. The secretary of the Industrial Welfare Committee holds that this figure should be trebled when the incidental and indirect losses are taken into account. The workmen's compensation act was intended to be comprehensive, limited only by the words "arising out of and in the course of employment." But Sir John thinks that to make one man liable for the crass stupidity, gross carelessness or flagrant breach of orders by another did not come within such comprehension at the time. Yet such has been the legal interpretation of the act. Moreover, the psychologic effect on the workman of the certainty of compensation under all conditions is great. It leads to the taking of unnecessary risks which would not be done if he had to suffer for his own folly or disobedience of rules, as he has to apart from his work. There are grounds for thinking that quite a number of slight but compensable accidents occur when trade depression is looming. Sir John therefore asks for a recasting of the act so as to bring it into conformity with the original intentions when it was passed. However just and desirable this may be, not in the interests of employers, who must pass on all costs to the price of their products, but in the interests of overburdened British industry, it does not seem likely that anything will be done, as all political parties are too afraid of the labor vote to do anything that can be so easily represented as hostile to the working man.—From London Correspondent, *American Medical Association*, April 9, 1933.

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"THE PHYSICIAN IN INDUSTRY *is one who applies the principles of modern medicine and surgery to the industrial worker, sick or well, supplementing the remedial agencies of medicine by the sound application of hygiene, sanitation and accident prevention; and who, in addition, has an adequate and cooperative appreciation of the social, economic and administrative problems and responsibilities of industry in its relation to society.*"—Conference Board of Physicians in Industry.

EDITORIAL

The Industrial Physician

ELSEWHERE in this issue (p. 1) Dr. Sappington has commented on what the industrial physician is thought to be—what he is and should be—and what he can be.

Risking the statement of the obvious, it should be said that the competent industrial physician is first a good doctor—he must have a good medical background and have had experience in practice. Superimposed upon this should be specialized knowledge and experience relating to the problems of industrial medicine.

There is still doubt in the minds of some that industrial medicine is a definite specialty, in spite of the fact that well recognized and accredited universities are giving special courses in this field. It seems rational to believe that the industrial physician occupies an analogous position in industry to the internist in private practice; the latter correlates all of the data of the examinations of specialists with his own knowledge of the patient and works out an individual program. This the industrial physician does, making use of a wider group of scientists than the internist, for the industrial physician has the opportunity and the necessity of consulting various types of engineers, chemists, physicists, lawyers, statisticians, and others whose counsel and services are of distinct value. The industrial physician, however, must know the basic fundamentals of the special lines of endeavor which are peculiar to his work, namely, occupational diseases and their manifestations; industrial toxicology; ventilation and illumination; statistics; factory sanitation; and personnel management. This is not an exhaustive list but the important items have been named. One does not expect the industrial physician to be an expert tinsmith or to be capable of installing an adequate system of exhaust ventilation; neither does one expect him to be an authority on illumination principles; but he must know enough about these divisions of his work and the others named, to carry on intelligent conversations with persons who have specialized training and experience in these lines and to know when the services of such persons are needed, as well as to interpret their findings when given. One has only to repeat many experiences in medicine to prove that too often the physician who has had no training or experience in these specialized lines, falls far short of performing his true functions in industry and makes glaring mistakes in diagnosis, to say nothing of being deficient in the principles of prevention. The activities, therefore, of the industrial physician cover a very wide scope.

Another concept, which perhaps is unusual to most people, is that of the industrial physician as an administrator. There is no good reason why the industrial physician should not be a capable administrator, because in many other fields of public health endeavor, physicians have become good administrators. Certainly the opportunity is afforded and in instances of wise industrial management, this opportunity is encouraged. The physician in industry is, therefore, capable of controlling large numbers of persons, relative to their health supervision.

Perhaps the most bewhiskered fallacy concerning the industrial physician is his role as a medical economist. In the minds of most people, doctors are notoriously poor business men. But the

industrial physician who is successful and performs his functions properly, must of necessity be able to convince the management that his work is of economic value to the extent that it can be put on a so-called "paying" basis. The proof of the pudding is not only in the eating but also in the tasting: information is furnished on good authority that during the recent economic adjustment, medical services in industry were in most instances curtailed only to an extent proportional to unemployment. Such facts would apparently put the successful industrial physician on the same footing of economic adequacy with other lines of industrial pursuits.

Experimental Research on New Organic Vapors

THE U. S. BUREAU of Mines has made some very valuable contributions in experimental research on animals regarding the effects of organic vapors. Previous reports have included research on ethylene dichloride, ethyl benzene, cellosolve, ethylene oxide, vinyl chloride and dioxan, some of these being liquids which give off vapors under certain conditions.

In a recent report*, dichloroethyl ether was used in a study of the toxicity and physiological response of guinea pigs exposed to the vapors of this substance.

Dichloroethyl ether is a solvent for fats, tars, waxes, resins and similar materials. The compound has been used in textile industries, for the removal of spots and also for incorporation in soaps.

Briefly, analyses were made of vapor-air mixtures and checked properly and animals subjected to measured dosages under controlled conditions. At autopsy, the various lesions were studied in detail and previous to autopsy the subjective symptoms were also determined.

The conclusions reached were in part as follows:

The physiological action of dichloroethyl ether is primarily irritation of the respiratory passages and the lungs.

In the order of their appearance the symptoms produced were nasal irritation, eye irritation, lacrimation, disturbances in respiration, dyspnea, gasping, and death. All of these appeared in concentrations of 0.026 to 0.10% vapor in air by volume. All except lacrimation were attained with 0.01%, while an exposure of 810 minutes to 0.0035% caused no symptoms other than signs of slight nasal irritation.

The principal gross pathological findings were congestion, emphysema, edema, and hemorrhage of the lungs. These occurred in all animals that died during or after exposure, the severity increasing with length of exposure, and also during one to four days after exposure.

It was not possible at room temperature to attain a concentration that would kill in a short time. Exposure to 0.10% for 30 to 60 minutes was dangerous to the life of guinea pigs; 0.01 to 0.02% is the maximum amount for 60 minutes without serious disturbance; and 0.0035 is the maximum amount for several hours exposure without serious disturbance.

Dichloroethyl ether possesses definite warning properties of odor, as well as eye, nose, and throat irritation in concentrations that are dangerous in an exposure of one hour or less. Concentrations below 0.01%, dangerous for exposure periods of several hours, possess an easily noticeable through not especially objectionable odor and little or no irritation.

The U. S. Bureau of Mines is to be congratulated on its progressiveness in doing this type of research; such material in a rapidly growing field of the adaptation of new chemical compounds, will be of considerable value in establishing standards for the relative toxicity when these substances are used in industrial processes.

Interpretation of Chest Roentgenograms

IN THESE days of feverish activity in the defense of alleged claims for lung diseases contracted because of alleged exposure to various types of industrial dusts, it is particularly refreshing to consider the remarks of several men who have had long experience in the interpretation of chest roentgenograms.

Dunham* has quite recently set forth in a brief fashion, illustrated by cases of chest roentgenograms, the essentials in the pathology of lung changes and their representation on the roentgenograms.

Pancoast, discussing Dunham's paper, outlines the criteria for the correct interpretation of chest roentgenograms as follows:

1. A knowledge of the anatomy of the lung.
2. A knowledge of the appearance of the lung

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* Schrenk, H. H., Patty, F. A., and Yant, W. P.: "Acute Response of Guinea Pigs to Vapors of Some New Commercial Organic Compounds (VII Dichloroethyl Ether)." *U. S. Public Health Reports*, 48: No. 46, 1389-1398 (November 17, 1933).

* Dunham, Kennon, M.D.: "Interpretation of Chest Roentgenograms." *J.A.M.A.* 101: No. 24, 1857-1859 (December 9, 1933).

in the roentgenogram within normal limits.

3. A knowledge of the pathology of tuberculosis.

4. How that pathologic condition appears in the roentgenogram.

5. The correct technique of the examination.

Although in this instance, these criteria are applied to the roentgen diagnosis of tuberculosis, they might also be well adapted to the roentgen diagnosis of silicosis and asbestosis, which are the two typically recognizable reactions to dust inhalation in industry. Since the chest roentgenogram plays a very prominent part in the diagnosis of these industrial dust diseases, the adaptation of these and similar principles in diagnosis is exceedingly important in the proper diagnosis and classification of such cases.

Vascular Effects of Lead Poisoning

THE QUESTIONS of a relationship between lead poisoning and diffuse vascular disease associated with hypertension, as well as co-incident with renal pathology, has been supported by evidence on both sides in the literature, clinically and experimentally.

According to Wirtschafter*, chronic lead intoxication has been demonstrated clinically to be associated with arterial hypertension. Thus, Allbutt and Gibson, Harris, Hayhurst, and Feil and Balsac have found hypertension to be present, as a rule, in workers exposed to lead over long periods of time. Mayers, in a survey of lead workers in New York, concluded that (a) "it does seem as though there may possibly be some relationship between the action of the lead on the neurovascular system and the hypertension which is found among these lead workers, (b) the incidence of arteriosclerosis is relatively high among all workers of the social and economic classes from which lead workers are recruited, and (c) the part which prolonged exposure to lead plays in the production of this arteriosclerosis is questionable."

Recent case reports by this investigator show that there can be very little question that the hyptertension in the cases reported was not of the essential or neurovascular type, but was associated with diffuse vascular disease.

This is supported by the findings, in that, (a) there was marked sclerosis of the radial arteries, (b) the fundi showed evidence of arteriolar sclerosis, (c) there was evidence of marked renal insufficiency without a history of acute nephritis, (d) administration of amyl nitrite did not lower the blood pressure as it does in the so-called neurovascular, or essential, hypertension, and (e) there was a history of long-continued exposure to lead. This conception was further corroborated by the patient's death following a typical cerebral accident and by the autopsy findings which were typical of diffuse arterial and arteriolar sclerosis, with arteriolar nephrosclerosis.

Pathologically, one cannot dogmatically state that the diffuse vascular sclerosis in any individual case is due to chronic lead intoxication since the picture one sees at autopsy is not unlike that in the usual sclerosis associated with senility. Arteriolar sclerosis together with hypertension due to lead has been produced experimentally by Petroff and others. Of special significance, however, is the history of long-continued exposure to lead, together with the relatively young age of the patient as compared to the vascular picture which is exhibited. The findings support the conception that long-continued exposure to lead may lead to severe and persistent hypertension which is associated with marked arterial sclerosis and with, what is of more significance, arteriolar sclerosis especially marked in the kidney.

* Wirtschafter, Zolton T.: "Lead Poisoning Followed by Diffuse Vascular Disease." *The Ohio State Medical Journal*, Vol. XXIX: No. 12, pp. 771-774, (December, 1933).

Where Individualism Persists

SEVERAL years ago, long prior to NRA, a student of industrial relations—viewing the steady progress in the humanness of the employer-employee contact—wrote as follows:

"It is no longer true that 'we have profoundly forgotten that cash payment is not the sole relation of human beings'; no longer true that 'we think, nothing doubting, that it absolves and liquidates all engagements to man.'

"Where the wage relation used to be the only employment relation, it is now only one of many. Still basic, still fundamental, it is builded over with the new relations that enlist and encourage and recognize the employee qualities which 'cash payment' merely as money cannot buy—the new relations that compensate for the universal acceptance of a contract of employment which is made 'as though sickness, accidents, invalidity and old-age had been banished from the earth,' but which, regardless of social considerations must continue in its ancient form until the reasons for a change needed become the laws of a change accomplished'."

Possibly NRA is a step toward the change needed. But the trouble is now that if the NIRA is to crystallize "the laws of a change accomplished," the general subject of industrial relations is likely enough to have to start over. For it is the considered opinion of a large and growing number that it has been set back to where it was 25 years ago—with the individual viewed *en masse*, his personal entity once more submerged in the relation between his employer on the one hand and "labor" as a whole on the other. To the Dr., however, he remains an individual.

Getting Personal

THE LITTLE sketches entitled "Who's Who in Industrial Medicine and Surgery," beginning with the one of Dr. Cheney on p. 39 of this issue, will probably say things about well-known industrial physicians and surgeons which they would never say about themselves and would be reluctant to have anybody else say about them. But why not? The writer of the sketches has an independent outlook and the courage of his convictions. He is not in the medical profession, nor is he in the business of industry. He believes, however, that the most interesting subject in either field—in fact in all the fields wherein subjects can be written about —is *men*. And in the intensely human relation of industrial doctor and employee patient why should the interest begin and end in the patient's troubles? This magazine is interested as well in the doctor as in the patient. And from the writer's point of view, the Doctor's modesty is not an important objection where the Doctor is (as Doctors in industry so generally are) himself an interesting human being.

Industrial Plant Surveys

IN SPITE of the number of publications to the contrary and the work of the U. S. Public Health Service and several state departments of health, the value of preliminary surveys of industrial environment has not yet sufficiently been emphasized. Too often whenever an investigation of the health hazards of any given industry is being made, there is no preliminary survey made to get the proper type of information which will indicate when and where physical and chemical determinations might be of value.

Bloomfield* has recently called attention to the importance of surveys of the industrial environment and divides them into two parts—(1) the sanitary survey proper and (2) the occupational analysis.

As Bloomfield well says: "The sanitary survey of the workroom environment may be likened to the inventory of materials and stock which a business establishment usually undergoes annually. The sanitary survey may well be regarded as a listing of the facilities afforded the workers while in the industrial environment. When one realizes that one third of the worker's day is spent in this environment, he clearly sees the necessity for a study of all those factors which bear on the health of the industrial worker."

In practice the sanitary survey consists in carefully filling out the inspection form and jotting down any additional notes on items which may not be provided for in the form. Under certain conditions, such as may exist in a coal mine, or a cement mill, some of the items listed on card forms may obviously be omitted. After filling out a survey card for each workroom in the entire plant, a detailed analysis of the data contained on the cards is then in order. It is such an analysis that enables one to form a picture of the hygienic conditions in each of the workrooms studied and in the plant as a whole.

The other important part of the study of workroom environment is the occupational analysis, which permits one to learn of the activities involved and the particular hazards associated with each occupation; in addition to this such an analysis discloses the number of persons in each occupation, giving an idea of the importance of each hazard from the point of view of numbers involved.

The importance of an occupational analysis in determining the extent of an occupational hazard is at once obvious, but there is still greater value in the subsequent steps necessary for the elimination of a condition known to be injurious to health. It is impossible to map out a constructive and effective program of prevention without definite knowledge of occupations, the many processes and activities which may be associated with unhealthful conditions.

Further information of value may be obtained by inquiring into the sickness rates of the various occupations involved and comparing these with the conditions in the environment of different groups within the plant. Additional information may be gained by inquiring into the labor turnover in the various occupations, for

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* Bloomfield, J. J.: "Preliminary Surveys of the Industrial Environment." *U. S. Public Health Reports* 48: 1343-1351, (November 8, 1933).

the presence of a high labor turnover in times of normal production often suggests unhealthful or unpleasant working conditions.

It is fully realized that there are certain problems in industry for which there is no simple solution; that some require a considerable expenditure of funds and the use of great ingenuity for complete solution; however, the greater use of the so-called preliminary surveys of the industrial environment which include the sanitary survey and an occupational analysis, with an examination into other pertinent factors, will certainly yield information which when properly applied will point out and indicate certain conditions which after investigation should establish the logical approach and intelligent point of view especially relating to further preventive procedures.

The Health of Workers in a Textile Plant

FROM TIME to time, research workers and industrial physicians have emphasized the necessity for making studies of the health of workers in various trades. In the past such studies have formed the basis for our knowledge relative to occupational hazards and have been incorporated in brochures and textbooks. The great need, however, is for the continuance of such studies, so that we may add to our present knowledge and, with the changing of processes and materials which takes place with great rapidity in certain industries, keep ourselves up with the times.

As an example of a recent study, the health of workers in a textile plant has been the subject of an investigation by the U. S. Public Health Service.*

The most important specific findings are as follows:

All room-groups show distinctly lower temperatures in the winter; but it is notable that the averages even in winter are never less than 80°.

As would be expected, in view of the use of artificial humidification in the weaving rooms, a much higher relative humidity (about 85%) was found in these rooms than in the others (52 to 58%).

During the summer the average effective temperature in all the rooms showed a condition which would be expected, on the basis of comments in the literature, to have a bad effect on health. The winter readings in the weaving rooms are of the same magnitude as the summer readings in the other rooms.

The rate of illness for cases of all durations was higher than that found in other studies of this nature. However, the rate of cases of eight days' duration and longer and for serious conditions (such as tuberculosis, pneumonia, etc.) was very low. The sickness rate was definitely higher for night workers than it was for day workers.

From the physical examinations the only respiratory rate showing percentages of striking nature is that of nasal pharyngeal catarrh (from 22 to 45% by room). There was a definite tendency for the workers to be under the average weight of American industrial workers. This tendency was not more pronounced, however, with increasing length of service.

* Britton, Rollo H., Bloomfield, J.J., and Goddard, Jennie C.: "The Health of Workers in a Textile Plant." *Public Health Bulletin* No. 207, July, 1933.

Letters to the Editor

"Talks on Industrial Medicine"

To the Editor of *Industrial Medicine:*

YOU MAY be interested in the following schedule of talks on industrial medicine to be given over Station WCFL each Friday noon at 12:30. I have just completed writing these addresses and they will be given by me or the director of the department, Dr. Frank J. Jirka:

Jan. 26, "Phases of Physical Fitness in Industry Today."

Feb. 2, "The Hide and Hair Industrial Menace —Anthrax."

Feb. 9, "Lead Poisoning in Industry and Its Prevention."

Feb. 16, "Bone Button Infection in Industry (Erysipeloid Bacillus)."

Feb. 23, "An Ancient Occupational Disease in Modern Industry (Silicosis)."

Mar. 2, "Asbestosis As An Industrial Menace."

Mar. 9, "The Hazard of Arsenical Poisoning in Industry."

In several instances credit has been given to your publication for paragraphs taken from various numbers.

I have also asked the department to forward copies of previous talks on the subject and to place your name on our mailing list. It is planned to incorporate the series in book form at a later date, for free distribution.—C. W. CHAMBERLAIN, Asst. Supt. of Social Hygiene, State Dept. of Public Health.

Industrial Medicine Digest

Blood Pressure

DR. R. L. CARTER, *in The Journal of the Medical Association of Georgia*, (May, 1933): — This is an analysis of blood pressure readings taken in 500 physical examinations and forms an important body of data for comparison when making physical examinations of industrial employees where blood pressure readings are taken.

All examinations were made of people either employed or applicants for employment. The majority of the individuals were under 30 years of age and were almost equally divided between males and females. The examinations were made between the hours of 1:00 and 3:00 P.M. A standard blood pressure apparatus was used, two readings were made and an average taken of the two; in abnormal cases, many were rechecked at a later examination, so that the figures would be reasonably accurate.

In this report 532 individuals are included, 254 males and 278 females. According to age they were divided as follows: 325 were between the ages of 20 and 30, 159 were between 30 and 40, 37 between 40 and 50, and five were 50 or above. In this group 71 or 28% of the males and 61 or 22% of the females had abnormal blood pressure readings. Hypertension and hypotension are included. The normal blood pressure was considered to be between 80 and 100 mm. of hg. as the diastolic pressure and between 120 and 130 systolic. Between the ages of 20 and 30, 49 or 15% of the 325 persons had abnormal blood pressure readings. The blood pressure was abnormal in 44 or 28% of those between 30 and 40 years of age and in 23 or 62% of those between 40 and 50. The highest systolic pressure noted was 260 mm. of hg. while the highest diastolic was 140. In 59 individuals the diastolic pressure was 100 mm. hg. or above, these constituted approximately 50% of all the cases of hypertension. These were considered as true cases of hypertension as various authors agree that essential hypertension does not occur without a corresponding rise in the diastolic as well as the systolic blood pressure. There was evidence of cardiac involvement in 35 of the individuals who had hypertension. In the majority of cases this consisted of cardiac hypertrophy; however, systolic murmurs were present in six cases and in six cases thyroid disease was present. A study of the pulse in the hypertensive cases showed the pulse rate to be 90 or more per minute in 46 cases. In the group with abnormal blood pressure 12 or 10%, were overweight and 20, or 17%, were under-weight. This corresponds very closely with recent examinations of U. S. Army Officers of the southeastern district. Of the total of abnormal pressures noted in the series of cases 26 were found to be suffering from a hypotension of 110 mm. hg. systolic or less and from 50 to 70 diastolic.

Dr. Carter concludes that the study seems to indicate that a larger number of the middle class people are suffering from hypertension than is commonly thought. The average individual is not aware of his condition and does not report for examination or treatment until irreparable damage has been done. Many of these people can be made useful and productive citizens by regular physical examinations and treatment consisting mainly of proper rest, adequate diet, the removal of foci of infection, and drugs which tend to relax and lower abnormal blood pressure.

Treatment of Knee Injuries

DR. GUY A. CALDWELL, *in Texas State Journal of Medicine*, (May, 1933):—The most frequent type of knee joint injuries are as follows:

1. Contusions, abrasions and bursitis.
2. Strains of the lateral ligaments.
3. Internal derangements: (a) displaced, torn or loose semilunar cartilages; (b) pinched synovial tabs; (c) loose bodies.
4. Fractures intersecting the knee joint from the patella, tibial plateau and femoral condyles.
5. Punctured wounds and foreign bodies.

It is most important that the patient be given proper and adequate instructions, to secure the best results. The author has used the following instructions in his treatment of patients: (1) wear the adhesive stripping and massive dressing until soreness is greatly improved and there is some motion without pain; usually two to four days; (2) use crutches without bearing weight on the joint until all swelling has disappeared and until there is no pain when the joint is flexed through at least 90° of motion; (3) upon removal of the adhesive and dressing, substitute an elastic knee support and begin hot baths followed by massage; (4) continue the use of crutches but begin light weight-bearing only after tenderness ovr the ligament has disappeared. Progress from both crutches with light weight-bearing to one crutch only, and finally to a cane. The single crutch or cane should be used on the opposite side from the injured knee; (5) continue use of the elastic knee support for one to two weeks after full weight-bearing is permitted.

An analysis of the steps through which a convalescing weight-bearing joint should progress is named by the author: (1) from absolute immobilization and rest the patient should proceed to active motion through a limited range a few times each day; (2) allowing the patient up on crutches with the limb unsplinted, have him gradually increase the range of active motion; (3) permit him to bear a little weight on the injured knee for a few steps and if he feels but little or no pain, he may be advised to increase gradually the amount of weight borne and the range of voluntary movements during the following days; (4) when the preceding steps have been accomplished without aggravating the pain, swelling or stiffness, the patient may begin to walk with the aid of a single crutch only, using it on the well side; (5) after a few days of using the single crutch, a cane may be substituted and later it may be discarded.

Aspiration of the joints is an important procedure and is indicated when: (1) the tension of accumulated fluid is great and causes pain; (2) an associated fracture indicates that there is hemorrhage in the joint; and (3) for the diagnosis of suppurative arthritis.

The author concludes that the successful treatment of knee injuries deing only after tenderness over the liga-

(1) an accurate diagnosis of the nature and extent of the injury; (2) the primary indications for replacement where displacement exists, followed by joint rest and support; (3) due regard for the weight-bearing function of the joint; (4) recognition of the importance of controlled exercise, heat and massage in joint convalescence; (5) knowledge of the clear-cut indications for operative intervention; and (6) clean, non-traumatizing knee surgery and careful post-operative and convalescent care.

Roentgenological Aspects of Pneumoconiosis

DRS. HENRY K. PANCOAST and EUGENE P. PENDERGRASS, in *The Journal of Industrial Hygiene*, (May, 1933):—The authors summarize a classification of silcotic appearances in the x-ray based upon known pathological changes as follows:

1. Peribronchial-perivascular-lymph node predominance or type. This may be rapid or slow, usually the latter.

2. Early interstitial predominance. This may be extremely or moderately rapid, depending on the silica intake. It may or may not have an associated slight nodular appearance.

3. Advanced interstitial predominance.

4. Nodular predominance. Rapidly or slowly progressing.

5. Advanced diffuse or terminal fibrosis.

Conglomerate type; interstitial type and massive fibrotic type.

A complete discussion of working hazards is given in this article, together with a consideration of the responsibility of the employer in providing protection, as well as the medico-legal aspects of cases and research work incident thereto.

In commenting upon the difficulties, the authors believe that but one satisfactory outcome is possible in the tangled situation. Compensation laws must be passed by each state as nearly uniform in essential details as possible in order to avoid any effects leading to unjust competition. Medical boards must be created having among their many other duties, full authority to decide upon the merits of all claims for disability from pneumoconiosis, without recourse to conflicting medical testimony. This would require that all members of such boards should be thoroughly familiar with all aspects of the condition. The physical problem such as dust counts and analyses of dusts would have to be taken care of by experts in these lines. The board could have the advantage of investigative work by such bodies as the United States Public Health Service. Experimental work would probably have to be carried out as it is at present by well recognized private individuals or institutions. This seems like a Utopian scheme for this country, but it is only because we are a nation of individual states, each one of which must adopt procedures which in other countries are carried out with satisfaction by central governments.

Such medical boards, in order to be fully efficient, should have authority and be able to pass reliable judgment upon the health and the condition of the lungs of all applicants for positions under new employers and to provide means for the periodic examinations of all employees in hazardous dusty occupations. In the first instance, they should give due consideration to all possible effects from previous occupations, bearing in mind the progressive nature of silicosis of comparatively rapid development, even after years of cessation from hazardous dusty environment. The last employer is not always responsible for the development of an incapacitating silicosis, as is well demonstrated in certain cases.

An Experiment in Industrial Medicine

DR. M. S. BLOOM, *in the Journal of The American Medical Association*, (June 10, 1933):—This new plan in industrial medicine has been applied to a large bakery organization.

Some of the details of the medical service as provided are:

The functions of the benefit association are governed by a constitution and by-laws, adopted by the members. The facilities of community medical service agencies are used. Any member of the association may consult any physician whom he wishes. If an employee is sick, he simply obtains from the secretary of the association a form, which he presents to his physician. If the employee is unable to call at the office for the form, he reports this later to the secretary. Both house calls and office calls are permitted.

The members receive medical and surgical attention, including major and minor operations; eye, ear, nose and throat service; roentgen examination; dental service, limited to roentgen examination and extraction, laboratory, and ward service in the hospital, not exceeding 30 days in any one year, and at $3 per day. When it is necessary to hospitalize a member, benefits are not paid. They are paid, however, when the patient is released from the hospital, except in case of a surgical operation. The term "hospital" does not include a tuberculosis sanitorium or institutions for chronic diseases.

The association pays the prevailing medical and dental fees in the community. A special committee consisting of the president of the Broome County Medical Association, the president of the Binghamton Academy of Medicine, and the president of the Binghamton Dental Society, and the author, was set up to pass on bills if there seemed to be any question of exorbitance or padding. To date this committee has not been called to confer on this problem.

Benefits are paid when a member is absent from work because of sickness. Members are entitled to 10 weeks' sick relief during any one year. The scale of benefits is established in proportion to the amount of dues the particular member pays.

Restrictions are placed on the amount of money that may be expended for medical or dental services on any one member during the course of a year. The maximum is set at $350 per member. House and office calls are limited to $50 per member annually, and dental service to $25 per member.

The membership of the association is divided into classes according to the wage received. There are four classes of employees. The dues paid by the classes are as follows: class 1, $.20 a week; class 2, $.25; class 3, $.35; and class 4, $.45.

For each dollar collected in membership dues, the company contributes one dollar to the association treasury. In case of sickness, class 1 members receive $7.50 a week; class 2, $10; class 3, $15; and class 4, $20.

During the course of the first year's operation, association members consulted 65 different physicians and 25 different dentists.

While this experiment has been limited to a relatively small group of people and has extended over a short period, its continued operation may bring forth some facts and methods of procedure that may be applicable to larger groups.

The history of the experiment up to

this time indicates that small weekly payments by the employees, supplemented by an equal contribution by the employer, makes possible the provision of a very satisfactory type of medical service, with an acceptable and equitable distribution of costs and the application of the principle of freedom of choice.

The success of this plan, in a great measure, has been due to the splendid cooperation of the doctors and dentists in the community.

Dermatitis in Cotton Mills

DRS. LOUIS SCHWARTZ and CHARLES L. POOL, *in The Journal of Industrial Hygiene*, (July 1933):—This study has to do with an outbreak of dermatitis in cotton mills, the causative agent being varnish. Consideration is given to the different types of materials used and a number of case reports illustrate the reactions of the various workers to the different materials. Patch tests were made use of in diagnosis and form the basis for the measurement of the sensitivity of the different persons.

The authors summarize their results:

Among the 32 workers who were exposed to the varnish on heddle frames in two cotton mills, 19 contracted dermatitis of varying degrees of severity after from three to four weeks' contact with the varnish. The more severe cases developed after the shorter periods of contact.

Patch tests on 13 of these cases showed that 12 of them were sensitive to varnish, including one case which was not exposed to it. Of the 12 cases found to be sensitive to the varnish, eight were patched with those ingredients of the varnish that were suspected of causing the dermatitis as well as with the varnish iself. Two of them showed sensitivity to both cumaron resin and ceresin. One was sensitive to cumaron resin and not to ceresin. Four were sensitive to ceresin and not to cumaron resin, and one was sensitive to neither cumaron resin nor ceresin alone, but to the varnish containing them. The ceresin was more active in causing the dermatitis than the cumaron resin.

Five people who did not have dermatitis, and who did not come in contact with the heddle frames, were patched as controls, and none of them showed any reaction to the varnish or its ingredients.

Three cases working in the factory where the heddle frames were made, who were suspected of having had mild cases of dermatitis while coming in contact with the varnish, were patched, and only one of them, the one who did the actual varnishing of the frames, gave a definite reaction to the patch of varnish.

The varnish off the heddle frame was more irritating than the dried fresh varnish, probably due to the hydrochloric acid which is given off by the ceresin containing chlorine after long standing.

It seems that the addition of normal salt solution to the materials used in the patch tests to simulate the action of perspiration added to the irritating action of these substances on susceptibles.

The combination of ceresin containing chlorine, and of cumaron resin containing sulphuric and sulphonic acid, in a varnish which was exposed to the action of a relative humidity of 80%, and a dry bulb temperature of 80° F., coming in contact with the perspiring skin on the forearms of the workers, caused a dermatitis on hypersensitive individuals, probably due to the hydrochloric, sulphuric, and sul-

THE BULLETIN

of

The American Association of Industrial Physicians and Surgeons

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THE OBJECT of this Association shall be to foster the study and discussion of the problems peculiar to the practice of industrial medicine and surgery; to develop methods adapted to the conservation of health among workers in the industries; to promote a more general understanding of the purposes and results of the medical care of employees, and to unite into one organization members of the medical profession specializing in industrial medicine and surgery for the mutual advancement in the practice of their profession.

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phonic acids liberated or formed. Whether this hypersensitivity was natural in these individuals, or whether it was acquired by prolonged contact with the varnish could not be ascertained.

Carbon Monoxide Asphyxia

DRS. HOWARD W. HAGGARD AND LEON A. GREENBERG, *in the Journal of The American Medical Association*, (June 24, 1933):— This paper is a discussion of the scientific and research aspects of the problem of the use of methylene blue as an antidote for carbon monoxide poisoning. The authors claim that methylene blue is a synergist and not an antidote.

These claims are based upon a review of the physiology and pathology of cyanide poisoning and carbon monoxide asphyxia, showing the differences, experiments on rats, and the results of experiments on dogs.

As stated in the article: ". . . . The control animals were sufficiently recovered from asphyxia to respond to a pinch with only 30% of their hemoglobin free, and to walk with 52% free for the transportation of oxygen. The treated animals were not recovered to these degrees until they had 39% and 63% of their hemoglobin again in functionally useful form. The difference between these two pairs of figures indicates the accessory ill effects of methylene blue. In this respect methylene blue resembles such drugs as cyanide and lobeline.

"Lobeline also was once advocated as a resuscitant but has now been generally discarded. There are many such drugs, all of which induce a temporary increase of respiration and thus promote the elimination of carbon monoxide. But no drug has yet been found, with the exception of carbon dioxide diluted in air or oxygen, that has not a greater effect as a poison than as a remedy in the treatment of asphyxia.

"The most striking difference between the two groups of animals—the controls and those treated with methylene blue—was evident on the following day. At that time the control animals were active and appeared in every way normal. On the contrary, the dogs that have survived after injection of methylene blue were all ill; they appeared lethargic and their legs shook on standing."

The authors conclude that there is no valid basis, theoretical, experimental or clinical, for the belief that methylene blue is an antidote for carbon monoxide asphyxia.

The chief effect of methylene blue is to convert some of the hemoglobin of the blood into methemoglobin. By thus further diminishing the oxygen carrying capacity of the blood, methylene blue acts as a synergist with carbon monoxide in promoting asphyxia. It probably exerts also other deleterious effects.

Experimental evidence is presented showing that the administration of methylene blue in carbon monoxide asphyxia may induce fatalities that would not otherwise occur. Illness attributable to the effects of methylene blue persists after recovery from carbon monoxide asphyxia.

These conclusions reinforce previous evidence that hypodermic and intravenous medication is more likely to be injurious than remedial in the treatment of carbon monoxide asphyxia.

Surgeon and Insurance Carrier

DR. W. R. WAGGENER, *in Colorado Medicine*, (June, 1933):— An abstract of the Workmen's Compensation Act of Colorado is printed in this article. The Industrial Commission has the power to establish a schedule fixing the fees for all medical, surgical and hospital treatment and the following rules govern the application of the fee schedule: (1) reports relative to condition of employees under treatment without extra charge; (2) reports must show in detail the nature and extent of injury and full description of treatment; shall be made by attending physician; (3) bills must be itemized showing date of each visit, dressing, or operation and charge for each service; (4) in cases where flat fees are allowed, it is not permissible to charge additional fees for visits, dressings, treatment, etc.; (5) fees for daily dressings shall not be paid unless the nature and extent of injury as shown by proof on file clearly indicates the necessity for same; (6) the fee schedule includes all dressings unless case shows that an excessive amount of material had to be used, in which case it will be charged at cost; and (7) in all cases, not included in the schedule, fees shall be such as may be fixed by the Commission upon application of any party interest after a hearing thereon as provided by law.

In regard to hernia, apparently claim men have a well-defined idea that the medical profession recognizes all hernia as congenital. Under the present law, three things are necessary for the claimant to prove that his case comes under the act; (1) that he had no hernia prior to the accident; (2) that he suffered an injury; and (3) that the injury was accompanied by pain and nausea.

Compensation cases require more time and work on the part of the surgeon than private cases. If a surgeon expects to do this work, the requirements must be met. In making up the list of surgeons for any given company those men selected are the

ones who are known to the company as meeting the requirements, and the fact that this work is confined to a few is not a reflection upon the ability or integrity of other surgeons, but a matter of good business on the part of the insurance carrier.

The attitude of insurance carriers is that the claimant should receive all that he is entitled to by law. No man is to be deprived of compensation to which he is legitimately entitled, and no one thing more should be exacted of an insurance carrier than that which he should be responsible for under the compensation act.

Absolute honesty and fairness must prevail. The surgeon must be fair to claimant, fair to insurance carrier, and fair to himself if he would succeed in industrial work. If this fact is kept in mind, a great deal of good may be accomplished. Injured employees will be restored to usefulness. Malingerers will be circumvented. Fake claims will be reported and the intent and purpose of the Workmen's Compensation Act will be carried out.

Safety Regulations for Refrigeration Equipment

DRS. YANDELL HENDERSON and WALTER V. BATSON, *in The Journal of Industrial Hygiene*, (May, 1933): — Recent experiences have proved that it is very important to regulate refrigeration equipment in order to control the gases or volatile liquids which may produce toxic effects if they escape from the piping systems.

The following recommendations are, therefore, made to reduce such possible hazards to a minimum:

1. The refrigerators should be divided into groups, each group having its own compressor and piping system as follows: (a) three built-in-refrigerators; (b) the garbage refrigerator; (c) the refrigerators in kitchen and serving room (one in each); and (d) the cooler for drinking water.

2. The quantity of refrigerant in each system shall not exceed 20 pounds.

3. Suitable devices shall be installed at the compressor for each system, and at proper points in rooms near the various refrigerators which will allow the charge of refrigerant to be discharged into the air outside the building if the devices are subjected to a temperature in excess of 160°F.

This requirement was adopted as the hazard, caused by the use of the selected refrigerant under the conditions existing in these buildings, is very small unless the refrigerant is exposed to fire or extreme heat.

There is little likelihood that any part of these refrigerating systems will be subjected to fire or extreme heat, owing to the fireproof character of the buildings and to the fact that all of the buildings are heated by steam from a central plant and in most of them the cooking apparatus will be heated by electricity.

The rooms in which refrigerators or apparatus will be located are remote from sleeping rooms and the main kitchens are provided with ample ventilation by motor-operated fans.

It is therefore felt that with the safety precautions indicated there should be little danger to life or health through the installation of refrigeration apparatus in these buildings.

(These findings relate particularly to the use of refrigeration equipment at Yale University.)

Central States Society of Industrial Medicine and Surgery

Official Proceedings

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Associate Editors:
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W. C. Nordholz, M.D.

NOTICE

THERE will be a joint clinical meeting of the Institute of Traumatic Surgery and the Central States Society of Industrial Medicine and Surgery on February 20th, at St. Lukes Hospital, Chicago, and a dinner and scientific meeting in the evening at the Medical and Dental Arts Club.

Industrial Illness in 1932

DEAN K. BRUNDAGE, *in U. S. Public Health Reports*, (July 28, 1933):—This report is a statistical study giving the incidence of illness among industrial male employees in 1932 as compared with earlier years.

Tabulations are given showing the frequency of specified causes of dis-

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ability lasting eight consecutive calendar days or longer in various industries from 1927 to 1932; the frequency of specified respiratory diseases causing disability for eight consecutive calendar days or longer in various groups; the same data is applied to diseases of the digestive system; and also the frequency of nonrespiratory and nondigestive diseases which caused disability for eight consecutive calendar days or longer.

In 1932 as a whole the frequency of cases of disabling sickness lasting eight days or longer among a sample group of male industrial employees differed little from the incidence recorded for the preceding year. In each of the past three years, in fact, the sickness rates for this group have exhibited remarkable stability at a lower incidence level than during the 1927-29 period.

For certain causes of disability, however, greater changes in frequency may be noted. The respiratory disease rate was higher in 1932 than in either of the two years immediately preceding, due chiefly to an unusual prevalence of influenza in March and again in December, 1932. On this account the rate of sickness exclusive of influenza is of particular interest as an index of health conditions aside from influenza. For the group under observation no year of record (1921 to date) shows a lower rate of sickness exclusive of influenza than that for 1932.

Although the influenza rate was higher in 1932 than in 1931, there was no increase in penumonia. This result conforms with the record of mortality in the industrial population. Deaths from pneumonia dropped in 1932 to a new minimum which represented a decline from the previous low point recorded in 1931. There was no change in the frequency of new cases of tuberculosis of the respiratory system in 1932 as compared with the preceding year among the men included in the record of sickness. Mortality records also show favorable rates for tuberculosis.

Other disease groups showing relatively low sickness incidence rates in 1932 in the sample available for the industrial population include digestive diseases as a whole, diseases of the skin, and the infectious and parasitic group of diseases.

The 1932 morbidity record was less favorable for certain disease groups, including diseases of the circulatory system and especially for diseases of the heart, for certain "general" diseases, and for non-industrial injuries.

As has been pointed out in previous communications, these sickness rates are based on the reports of a group of about 40 industrial establishment sick-benefit funds, and apply in the main to employed men, although many work only on a part-time basis. For information concerning the health of the unemployed, other data obviously are required.

The Medical Profession and the Industrial Commission

DR. J. NEY MILES, *in Southwestern Medicine*, (May, 1933):—The author expresses the need for economy in the administration of the Industrial Commission of Arizona, citing the fact that the medical costs of the Industrial commission's work is now in excess of 30% of the premium receipts.

The figures for the years 1925 to 1931 inclusive in the experience of the Arizona commission are as follows:

Of 6468 injury cases carried by private insurance companies as well as the State Fund, on which the payment of

compensation was less than $50, $30.86 was paid for medical care. Of 3728 cases where compensation payments were between $50 and $100, $49.90 was paid for medical attention. Of 2045 cases where compensation payments were between $100 and $200, $82.67 was paid for the medical care. Of 760 cases where compensation ranged from $200 to $300, $122.77 was the cost of the medical care. Of 563 cases where compensation averaged from $300 to $500, medical cost averaged $175.07. Of 430 cases where compensation ranged from $500 to $1000, the medical cost averaged $234.24. Of the 506 cases where compensation averaged over $1000, the medical care averaged $526.49.

Industrial Dermatitis

DRS. LOUIS SCHWARTZ AND LOUIS TULIPAN, *in U. S. Public Health Reports*, (July 28, 1933):—This report concerns the occurence of dermatitis from chemicals used in removing velvet pile.

The process is described, and also the material which is used to remove pile from the velvet. Three case reports are given in detail with a description of the lesions.

It is also stated in the report that five such cases have been reported to the State Department of Health in Connecticut.

In discussing the findings, the authors state that the skin irritant in the three cases cited was 7% solution of sulphuric acid used in the air gun. Although complete carbonization is supposed to take place in the drying oven, yet the pile scraped off the velvet by the girls had an irritating action on the skin. All the materials which are used for removal of pile from the various materials are skin irritants. Even the small amount of formaldehyde used as a preservative in the aluminum chloride-tragacanth combination may be a skin irritant to hyper-sensitive individuals.

The Connecticut cases occurred among users of the aluminum chloride - tragacanth - formaldehyde mixture.

The use of acid solutions as a spray seems to be more hazardous than the use of the aluminum chloride jelly. In the manufacturing concern where the patients in the three cases here reported worked, the substitution of the aluminum chloride jelly for the sulphuric acid solution and the employment of colored persons stopped the occurrence of dermatitis. Whether the skins of colored people are less sensitive to this material than the skins of white people has not yet been determined.

Workers in this process should be protected by wearing rubber gloves and long sleeves, and those using the spray gun and scraping the charred pile should do such work under an exhaust hood and, in addition, should wear rubber gloves and long sleeves.

Head Injuries

DR. H. E. LEFEVER, *in Ohio State Medical Journal* (August 1, 1933):—This paper is a discussion of the late effects of head injuries, considering the following sequelae: depressed fractures; chronic subdural hemorrhage; meningocerebral adhesions; cortical contusions and lacerations; alterations in the ventricular system due to trauma; and cortical atrophy due to trauma.

Symptoms, diagnosis, and treatment are given for these various conditions.

Clinically the cases fall into three groups: (1) injuries to the head without focal symptoms but with general symptoms, namely, headache, tinnitus and vertigo; (2) cases with general and focal symptoms; and (3) cases of traumatic epilepsy.

Along with a carefully taken history, a complete, painstaking and detailed neurological examination should be performed upon every patient who has suffered a severe head injury. The eye grounds should be carefully examined and often the vesticular tests are of extreme value. Lumbar punctures, and encephalograms will also give valuable information.

In the past administration of anodynes and sedatives has been the accepted form of treatment of patients complaining of symptoms following head trauma. The author makes a plea for the use of sound surgical principles in the treatment of depressed fractures and of chronic subdural hemorrhages.

Write for Detailed Information

(and mention *Industrial Medicine*)

About:
The Items and Things Herein Described

To:
The Manufacturer Whose Name and Address Are Given

CASH'S WOVEN name tapes, to identify all kinds of clothing, personal and hospital, and No-So cement for affixing the name tapes to such clothing, as well as to articles where sewing is inconvenient or impossible, with adhesion tested to 70 washings and more, are made by J. AND J. CASH, INCORPORATED, South Norwalk, Conn.

THE DR. CHARLES ROBERT ELLIOTT Treatment Machine is a device for the application of internal heat, for use in chronic pelvic infection and other conditions, using a machine which delivers hot water under temperature and pressure control to a distensible rubber bag or applicator. The Elliott Treatment has been referred to by:

Paul de Kruef, in *Country Gentleman*, November, 1933.

Virgil S. Counseller, M.D., in *J.A.M.A.*, September 16, 1933, pp. 916-920.

Frederick C. Holden, M.D., and W. S. Gurnee, M.D., in *Am. Jour. Obstetrics and Gynecology*, July, 1931, p. 87; and

Chester Tilton Stone M.D., *Amer. Jour. Physical Therapy*, April, 1932.

Dr. Stone's results with the Elliott Treatment, as applied to urological cases, described in the last mentioned article, are of special interest to industrial physicians because of the shortening of the period of disability in gonorrheal infections. As sole distributors in the United States, the perfected Elliott Treatment Machine will soon be put on the market by A. S. ALOE COMPANY, 1819-21-23 Olive Street, St. Louis, Mo.

VEGEMUCENE is "that palatable vegetable mucinoid recently announced for the treatment of gastric and duodonel ulcer" which was described by Jacob Meyer, M.D., Edward E. Seidmon, M.D., and N. H. Necheles, M.D., Ph.D., under the heading "The Treatment of Peptic Ulcer with Powdered Okra," in *Illinois Medical Journal*, October, 1933. It is made by BIOVEGETIN PRODUCTS, INCORPORATED, 500-510 North Dearborn St., Chicago, Ill.

BUFFALO UNIT AIR WASHERS, in suitable sizes for consulting rooms, clinics, hospitals, offices, factories, recreation and rest rooms, etc., for all uses of air conditioning for health and comfort, providing heated air in cold weather, and washing out dust in all weathers—particularly pollens in the hay fever and rose fever seasons—are manufactured by BUFFALO FORGE COMPANY, Buffalo, N.Y.

Industrial Medicine News

Frozen Credits

FOLLOWING is a copy of a resolution of The Lawyers Club of Los Angeles, favoring a plan to loosen up the frozen credits of the medical and legal professions. As rapidly as possible the Club is getting it to organizations of both professions and to members of Congress.

The plan is to have a Federal agency prescribe a standard form of obligation to be executed by the client or patient, payable in five years, to be limited to debts arising from bona fide professional service, to be endorsed by the practitioner, then to be discounted by the agency. The doctors and lawyers spend freely in proportion to their incomes. A great deal of money would be put into very general circulation and the government would get most of it back.

Patients and clients, in the aggregate, are the solid, credit-worthy members of the community. They have needed professional service during the emergency. They need it now. They find it all but impossible to get cash with which to pay. The lawyers urge that they cannot do their full duty to the public unless they have money to provide facilities and to provide for their dependents.

WHEREAS, the Government of the United States has been extending credit to many classes of the community which have been unable to secure loans or extensions in the ordinary course of business;

WHEREAS, no such aid has been extended to professional men;

WHEREAS, professional men, notably lawyers and doctors, must render service when required regardless of the ability of the client or patient to pay;

WHEREAS, most members of the legal and medical professions have rendered such service during the years of economic depression and now have upon their books charges for such service against clients and patients who are willing to pay but who are unable to secure funds, despite the ownership of property;

WHEREAS, this condition has resulted in placing said professional men in serious financial straits, in that they must pay in money for certain of their facilities and the support of their families while unable to collect sufficient sums in money from their debtors; and

WHEREAS, the debtors of the professional men, in the aggregate, consist of the most responsible portion of the community, whose credit in the aggregate is the foundation of all local credit;

BE IT RESOLVED by The Lawyers Club of Los Angeles that the Congress and the President be importuned to act promptly for the relief of such professional men by setting up a system whereby the debtors of professional men, at least lawyers and doctors, may arrange long credit terms upon obligations that will be discounted at a low rate of interest by a Federal agency, thus releasing to the professional men amounts of cash in return for the credits which are now but frozen assets; and

BE IT FURTHER RESOLVED that copies of the resolution be dispatched to the California delegation in Congress, the President of the United States and that the committee take such other steps to foster the spirit of the resolution as it or the Board of Governors may be advised.

Dr. Banting Apparently Misquoted

DR. A. M. HARVEY, physician and surgeon, Chicago, in common with the rest of the public, read the following clippings:

"Toronto, Ont., Oct. 31.—Dr. Fred G. Banting of Toronto, co-discoverer of insulin, now in London, England, has now discovered means of preventing silicosis, according to word received here today."—*Chicago Tribune* Press Service.

"London, Nov. 2.—Discovery of a means of preventing silocosis, credited to Dr. F. G. Banting of Toronto, discoverer of insulin, will result in saving thousands of lives and will reduce mining costs greatly, it was announced here today."—*Buffalo Evening News.*

Dr. Harvey wrote to a friend in London, England: "Will you have careful inquiry made to secure all of the information possible on this alleged discovery of Dr. Banting?" Under date of November 15, he received the following: "Answering your letter of 1st November, we have conferred with Professor Clay and Dr. Middleton, who is the Home Office Authority on silicosis, and have visited the experts at the Home Office Industrial Museum. The press item from the *Chicago Tribune* regarding the prevention of silicosis, attributed to Dr. Banting of Toronto, also appeared in London papers but the authorities here consider it to be inaccurate and simply the report of some irresponsible reporter. Silicosis is also a racket in this country and the authorities are much interested in the press statement."

The Tercentenary of the Founder of Industrial Medicine

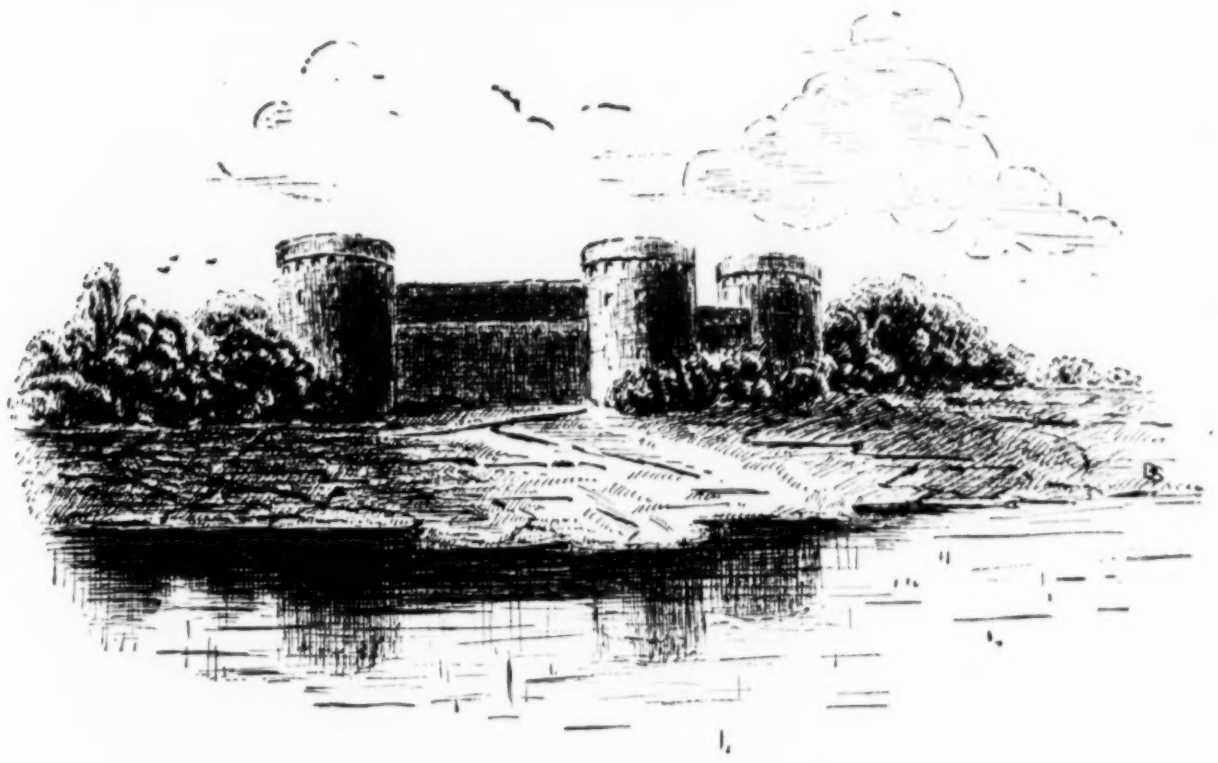
BERNARDINO RAMAZZINI was born in Italy on November 5, 1633. His name is famous in the history of medicine as the founder of industrial and occupational medicine from both the clinical and the preventive point of view. For 20 years he occupied the chair of medicine in the school at Modena in Italy and in this period contributed works on malaria and on the results of his research in physiology. He has indeed been credited with being the first to state that mercury in a tube rises when the weather is fair and goes down when the sky is cloudy. His greatest work, however, was his tratise on "Diseases of Tradesmen," published in 1700. At that time, when he was 67 years of age, he was invited to occupy the second chair of medicine at the University of Padua. From then on he lectured regularly until November 5, 1714, the day of his eighty-first birthday, when he succumbed to an attack of apoplexy. The work entitled "de Morbis Artificium" was published and republished in the original Latin as well as in other languages in many editions. It is based on direct observation of workers in various types of industry

and includes such interesting chapters as those concerning metal diggers, surgeons and others employed in frictions and inunctions in venereal cases, chemists, potters, painters, blacksmiths, "cleaners of Jakes," tobacconists, midwives, nurses and many others. He considered the diseases of those who stand much and of those who sit much, the diseases of wrestlers, of singers, of learned men, of those who work much with the eyes, of writers, of sailors and of innumerable others.

The Use of Tincture of Iodine on the Skin

AN interesting historical comment on the use of iodine in the disinfection of the skin is found in the June, 1933 letter, of the Paris Correspondent of the American Medical Association.

The method introduced in 1908 by Grossick of Trieste for the disinfection of the skin with tincture of iodine before surgical operations was rapidly adopted throughout the world. Dr. Robert Sorel of Havre, however, has for years opposed this procedure. According to Sorel, tincture of iodine has only a superficial value and does not assure a sterile operative field for more than 20 minutes, which is not sufficient. There develops a varnish-like covering composed of cauterized epidermis, in which fissures soon appear, which allow the subjacent micro-organisms to emerge, with the secretions of the cutaneous glands. The



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use of any other varnish would render exactly the same service as Sorel proved experimentally. Samples taken by means of a platinum wire passed over the skin 20 minutes after painting with iodine nearly always give positive cultures. The procedure gives a false sense of security, by dispensing with thorough disinfection of the skin, as was formerly done. Sorel, at the Hospital du Havre and in the clinic, operates without painting with iodine. The patient first takes a long bath; then, on the operating table, the operative field is covered simply with sterile compresses. The surgeon passes over the line of incision a compress dipped in sterile soap and wipes off the surplus with a dry sterile compress. He then operates, and when the skin is closed he removes the traces of blood with a compress dipped in sterile soap and then applies a sterile compress to the wound. No antiseptic fluid is employed at any time. Sorel has used this procedure with good results for more than 10 years. Tincture of iodine, he says, irritates the skin.

Cancer of Lungs Among Uranium Miners

THE REGULAR correspondent of the American Medical Association, of Prague, states that lung cancer of Joachimstal continues to attract attention. The disease was known for many years among the miners in Schneeberg in Saxony, but was described only a few years ago among the miners of the uranium mines in Joachimstal, from which radium is being produced. A commission was set up by the Czecho-Slovakian government to investigate this disease and its work was endowed by a grant from the president of the republic. The committee ascertained that the disease has been prevalent for many years in these mines but was not diagnosed as such, the high mortality among the miners being attributed to tuberculosis. It was found that about half of the deaths among the miners of Joachimstal can be attributed to the cancer of the lungs. The disease appears among the miners only after many years of work in this region and the average age of those who die of lung cancer does not differ materially from those who die from other causes. The average age of both these groups is about 53 years. The investigative work of the committee was hampered by the attitude of the miners and their families, who refused to submit to periodic examinations and necropsies in case of death. To obviate this, a special ministerial decree was issued which authorizes the chief physician of the miners' insurance to enforce a physical examination of the miners. A special bonus is given to the family of a miner who has died of lung cancer in order to obtain consent for a necropsy. The disease has been put on the list of the occupational diseases that fall under the workmen's compensation act. Besides this a special law is being prepared in the ministry of health which will regulate the preventive measures during the process of fabrication of radium and during its use for therapeutic purposes.

The Roentgenologic Examination of Nerves, Lymphatics and Blood Vessels

THE VIENNA correspondent of the American Medical Association calls attention in the letter of July 10, 1933, to a new method used in the visualization of nerves, lymphatics and blood vessels.

This demonstration of roentgenologic diagnosis by contrast mediums was given at a recent session of the Gesellschaft der Aerzte by Dr. M. Saito of Japan. To render peripheral nerves visible, Dr. Saito injected at first iodized poppy-seed oil and later a 25% solution of thorium dioxide applied percutaneously, perineurally or intraneurally. He used, at the most, 1 cc. intraneurally or 20 cc. perinurally. If the nerve to be reached lies in the deeper tissues, it must first be laid bare operatively. After from three to eight days the roentgenogram can be made.

In the roentgenograms exhibited by Dr. Saito, one saw a normal nerve (injected intraneurally) whose various bundles of fibers, 20 cc. in length, were plainly visible; then a perineural injection, in which the external and the internal layers were distinctly seen, and then a nerve with traumatic adhesions following an injury (which later could be broken up operatively). Great interest was shown in an injected nerve of a leprous, patient whereby the nodulus thickening became readily visible; likewise the roentgenogram of a neuroma. An epidural injection of an emulsion of iodized poppy-seed oil made also the lumbosacral plexus easily recognizable. Lymphatic vessels were made visible in the same manner, particularly by injection of the fluid into the larger lymphatic vessels, such as the knee joint, the peritoneal cavity or the lymph glands. One could see how the contrast medium spreads out into the lymph paths. One could see a lymph vessel along the leg, following injection of the knee; an intercostal lymph vessel following peritoneal injection (both in man), and in a dog an intrathoracic lymph vessel, likewise following a peritoneal injection. In the field of arteriography Dr. Saito secured with this method good results. In a case in which traumatic hemorrhage within the brain was suspected, he injected a 25% solution of thorium dioxide into the superior thyroid artery, and not only the cerebral arteries became visible but also the capillaries and the veins. In more than 200 cases in which, during the past two years, the author applied such injections, he saw no evidence of serious injury.

Important Advances in Public Health During 1932

ACCORDING to *Colorado Medicine* for July, 1933, the following important advances were made in the various fields of science during 1932:

1. Demonstration that tooth decay is caused by inadequate calcium, phosphorus, and vitamin D, and further discoveries of the chemical nature of vitamins.

2. A toxoid injection which will build up resistance to scarlet fever, and also a concentrated and purified toxin for use in preparing the toxoid, were developed by the U. S. Public Health Service.

3. Immunity to yellow fever is made possible by a new method, making use of mouse serum, reported Drs. T. P. Hughes and W. A. Sawyer of the Rockefeller Foundation, New York City, who have also devised a test for the effectiveness of the protection.

4. Experimental evidence that virus diseases of plants and animals are caused by a non-living chemical substance analogous to enzymes was reported by Dr. Carl G. Vinson of the University of Missouri.

5. The common cold lasts only three or four days and gives immunity for three months longer, illnesses being due to secondary infections, Dr. Wil-

son G. Smillie, of Harvard, reported.

Inhaling carbon dioxide relieves whooping cough, Professor Yandell Henderson of Yale reported.

7. Vaccine, promising to give immunity to endemic typhus fever was developed by Drs. R. E. Dyer, W. G. Workman, A. Rumreich, and L. F. Badger, U. S. National Institute of Health.

8. That lack of phosphorus and vitamin D in the diet is the chief cause of dental decay was reported by Dr. R. Gordon Agnew of West China Union University, whose results bear out those reported last year by D. E. V. McCollum and associates of Johns Hopkins University.

9. Discovery that murrina, fatal horse disease, is transmitted by the vampire bat, marking the third instance of a mammal being a disease-vector, was reported by Dr. H. C. Clark, director of the Panama laboratories of the Gorgas Memorial Institute, where the discovery was made.

10. Infantile paralysis is contracted from a germ or virus entering through the membranes of the nose and passing along the nerves of smell to the brain and spinal cord, it was concluded by Dr. Simon Flexner, director of the Rockefeller Institute for Medical Research.

11. Infantile paralysis occurs repeatedly in the same families, indicating a possible hereditary factor, reported Dr. W. Lloyd Aycock of Boston.

12. The germs of typhus fever and of spotted fever, though much alike, grow in different parts of the cells they invade, Dr. Henry Pinkerton of Peter Bent Brigham Hospital, and Dr. G. M. Hass of Children's Hospital, Boston, reported.

13. Mosquitos may carry tularemia, scientists of the U. S. Public Health Service found.

I. M. A. Silicosis Committee

O. E. Mount, *Chairman*

Silicosis and similar diseases caused by the inhaling of dust have created such a problem for all Illinois manufacturers, involving millions of dollars in claims for damages in common law suits, that the only remedy seems to be to include such cases in the Workmen's Compensation Act.

Several meetings of the Silicosis Committee and its sub-committee were held during the year. At a meeting on September 8, 1933, it was unanimously decided to introduce an amendment if possible at a special session of the legislature, reading as follows:

Amend paragraph seven of section three of the Compensation Act by inserting therein after the word in the second line, "vapors," the following: "silicon dioxide dust or other noxious or poisonous dusts," so that the paragraph shall read as follows:

"In any exterprise wherein molten metal, or explosive or injurious gases or vapors, silicon dioxide dust or other noxious or poisonous dusts, or inflammable vapors or fluids, or corrosive acids are manufactured, used, generated, stored or conveyed in dangerous quantities."

New provision: Thereafter add to section three a new paragraph 7¼ as follows:

"Any disability to or death of an employee resulting from exposure to silicon dioxide dust or other noxious or poisonous dusts, shall constitute an accidental injury for which compensation shall be payable under this Act."

After a brief presentation of the purpose of this meeting, Dr. A. M.

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Harvey of the Crane Company was called upon to discuss "Silicosis and Dust Diseases from a Medical Point of View."

Silicon and similar dust diseases, Dr. Harvey pointed out, confront Illinois and every other state. A few months ago it was estimated damage claims involving $50,000,000 had either been tried or started. Probably double that amount at the present time confronts employers. Compensation is asked of industry for certain workers who presumably are disabled, but in reality a tribute is being levied upon industry by those who are getting the tribute from the persons who claim to be injured. The money is going to smart doctors and lawyers.

"Thirty years ago," said Dr. Harvey, "it was predicted that a gradual increase of lung diseases due to occupational dust might be expected, but no one expected the growth of thousands of cases. It has been called a depression disease—the plaintiff has nothing to lose and may have something to gain.

"Silicosis and similar diseases are caused by the inhalation of microscopic particles of silica which lodge in the lungs and develop slowly—the progress of the disease depending upon the quantity inhaled and the time of exposure. Symptoms appear slowly, with shortness of breath and difficulty in breathing. The appetite is capricious, there is weakness, more frequent colds, bronchitis, influenza and presently tuberculosis following silicosis due to irritation.

"The question ultimately must be settled on a permanent basis with a properly drafted occupational disease law. A state board to pass upon silicosis and similar diseases should be appointed, separate from the present Industrial Commission. The Illinois Industrial Commission does not want a lot of lung cases. Dust will have to be stopped at its origin as a result of more careful methods in factories.

"Few industries can cope with this silicosis problem and remain financially sound, even if they settle the cases. There should be physical examinations at least every six months and if the workman shows tuberculosis or healed tuberculosis, he should be put in some other occupation. I know of 20 men who are the apparent picture of health, but x-ray examinations show silicon dioxide."

Dr. Harvey recommended that those present secure the following publications for a study of the effect of dust upon certain diseases: report by the Industrial Commission of Wisconsin, on "Effect of Dust Upon the Respiratory System;" report by the Industrial Commission of Wisconsin, giving general orders in connection with dust fumes, vapors and gases; report by a commission appointed by Governor Pinchot on occupational diseases, issued by the Pennsylvania Industrial Commission, Harrisburg; and *Journal of the American Medical Association* for August 19, 1933.

Legal aspects: A. C. Hirth of the Owens-Illinois Glass Company, talked on the "Legal Aspects of Silicosis and Other Dust Diseases."

Most cases involving dust diseases constituted a racket, he stated, but the problem had its serious side. While many cases were fraudulent, an employer could not go into court with their fraudulent character as a basis. Many cases were bonafide. There might or might not be liability. For 200 years there has been knowledge that certain diseases were caused by certain types of dust. The law contemplates that a workman should have a safe place in which to work. For 20 years there has been more or less knowledge of dust diseases in various countries, and for 15 years this country has been studying the effect of dust upon the respiratory system. The subject of special legislation covering dust hazards had been considered in a number of states and in several states laws relating to the hazard had been enacted. In states where such laws were not in effect, plaintiffs took their claims for damage before common law courts. This was exceedingly expensive for employers. The Pennsylvania Pulverizer case had cost $40,000 for legal expenses, including a record of the case. A verdict of $10,000 against the company had afterwards been set aside by the Court of Appeals on the ground that no negligence on the part of the employer had been established, but the expense of the case had to be borne by the employer.

Mr. Hirth thought all such cases should be tried under the Workmen's Compensation Act. There was no need of a jury. The evidence should be presented to commissions, as was the practice in Canada and Great Britain. He referred to 128 cases against one employer in St. Louis, which had netted $100,000 for one attorney. If silicosis cases were tried before a comission, it would be possible to pay the compensation in monthly instalments, and if the employee went back to work and showed an improved condition, the award could be cut down or discontinued.

J. L. Earlywine of the Illinois Steel Company stated that up to three or four years ago, no employer realized the danger from silicosis and other dust diseases. Twenty years ago no foundry ever had a case of silicosis. If lawyers and doctors were honest, most of the cases could be defeated, he said. He had defended cases during the last two and one-half years and had reached the conclusion that silicon dioxide was the only dangerous dust. He thought it would be sufficient to amend the Act to cover such cases. Every industrial employer of Illinois was subject to such cases, and must be in a position to defend himself against a racket. He referred to damages in which 50% of the fees went to the lawyers, and stated that if an employee obtained a judgment of $15,000 he would be lucky if he got $5,000 for himself after all the court costs were paid. He referred to an unsuccessful attempt to secure an amendment to the Workmen's Compensation Act at the last session of the Illinois General Assembly, the failure being largely due to the fact that the employers were not united. The present plan was to introduce an amendment to the Workmen's Compensation Act, which would include silicon dioxide and other dust diseases, and it would be necessary to obtain an agreement with organized labor to the amendment in order to have the proposal submitted in the governor's call for a special session, and also for the reason that a two-thirds vote of the legislature was necessary to insure the passage of the proposed amendment in a special session.

David R. Clarke, I. M. A. counsel, talked on the importance of having the amendment included in the call for a special session.

W. E. Crocombe of the American Manganese Steel Company, stated silicosis cases involving $20,000,000 in damages were on the court dockets in New York.

F. H. Elam of the American Steel Foundries, stated the increased cost of compensation cases in Pennsylvania covering silicosis amounted to about 8%.—O. E. Mount, Committee Chairman, in *Manufacturers News*, January, 1934.